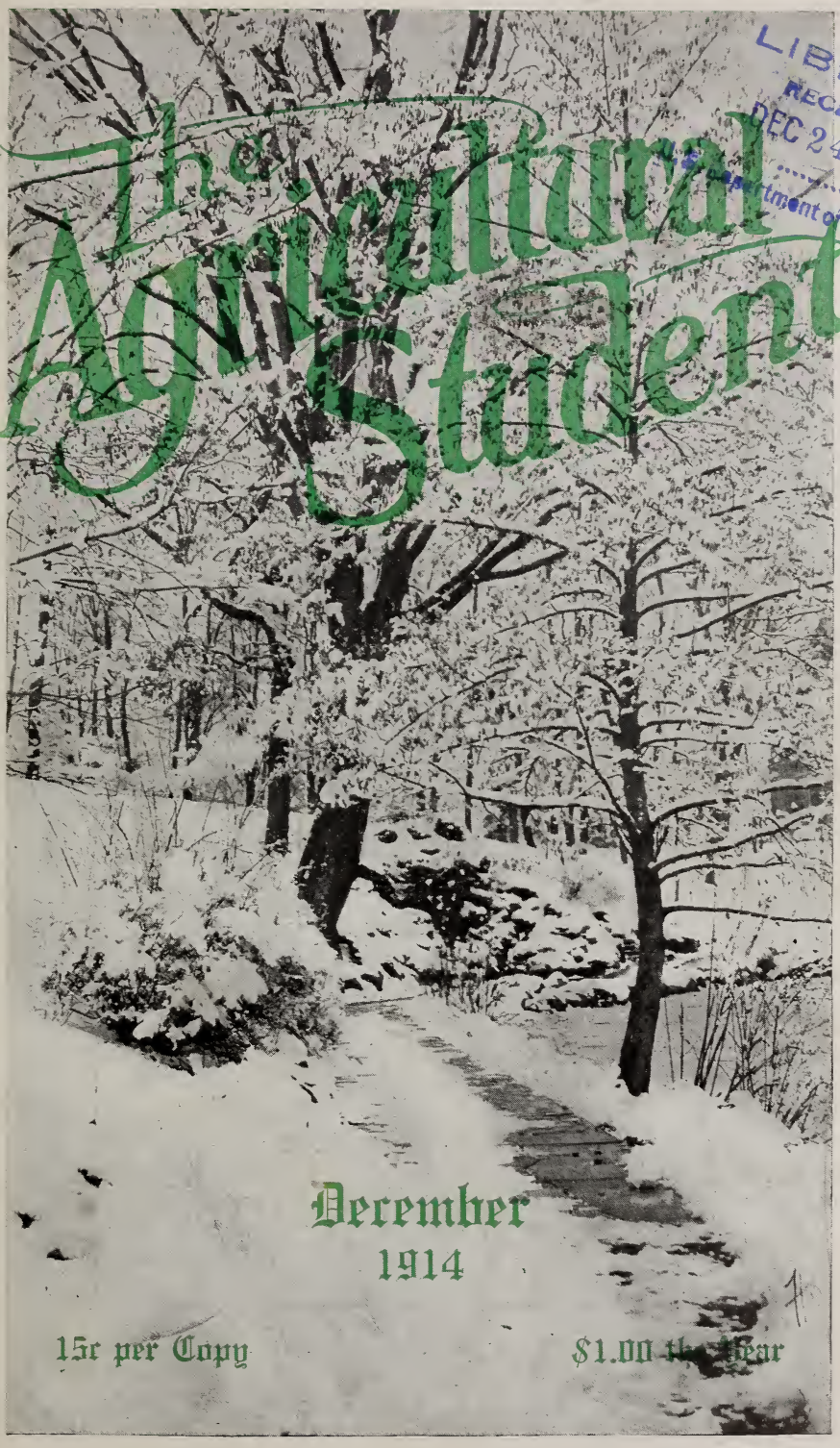

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December—why, of course we grin
And bear it shiverin' every minute,
Yet warm from time the month rolls in
Till it skites out with Christmas in it;
And so, for all its coldest truths
And chill, goose-pimpled imperfections,
It wads our lank old socks with Youth's Recollections.
—James Whitcomb Riley.

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FOOT AND MOUTH DISEASE

DR. D. S. WHITE
Dean of College of Veterinary Medicine

FOOT and mouth disease is a very contagious disease of cloven hoofed animals. It is characterized by the formation of blisters which occur on the mucous membranes and skin. The mouth, the interdigital space and the udder of cows are most often affected. The cause of the disease is an ultra-microscopic organism.

Foot and mouth disease is of common occurrence on the continent of Europe, in Asia and England, where despite the efforts of the authorities it smoulders continuously to burst forth into flame at periods causing enormous financial losses. While some years it seems to lie dormant, in others it becomes a devastating epizootic, spreading rapidly over the country, carrying destruction in its wake. As examples in the year 1910, it spread from Russia and Roumania westward over Germany, Denmark, France, the Netherlands and to Great Britain. In the year 1911 it affected in Germany alone 3,336,369 cattle, 1,629,927 sheep and 2,555,371 swine. While in 1910 France was supposed to be clear from the plague, early in 1911 it broke out and spread so rapidly that in a period of four months 3,217 districts harbored 33,966 outbreaks. While foot and mouth disease is not indigenous to the United States, it has on several occasions appeared in this country. In 1870 it spread from Canada into New England and New York; in 1884 there was a limited outbreak in Portland, Maine; in 1902 again in New England, in the states of Connecticut, Rhode Island, Massachusetts and Vermont, and in 1908 it was introduced through contaminated smallpox vaccine into New York, Pennsylvania, Michigan and Maryland. In each of these instances the drastic measures taken by the Bureau of Animal Industry successfully stamped out the disease. The present outbreak is the most extensive one which has so far visited our shores. However, at this time it is difficult to determine the extent of the plague as the reports of the experts who are scouring the country to unearth signs of the disease have not yet been filed.

Foot and mouth disease is not an especially fatal disease; the death rate from it is relatively small. It causes, however, great losses from its rapid spread, the injury it does the milk industries, the losses entailed through quarantine, and the sequelae (loss of claws, udder trouble, etc.) which follow in the wake of an outbreak. The estimated damage done cattle by foot and mouth disease amounts to an average of $20 per head for each animal affected.

The cause of foot and mouth disease, discovered by Loeffler & Frosch, is an ultra-microscopic virus which passes through coarse, but not the finest bacterial filters. The virus is always present in the vesicles, but is found in the blood only in the earlier part of the

fever stage of the disease. The saliva, tears, milk and nasal discharge are infectious from contamination with the contents of the vesicles. As the disease progresses, the virulency of the virus decreases.

The virus is killed by drying at room temperature for about 24 hours. On the other hand, the virus in dilutions of one-tenth can be kept virulent 3 to 4 months in sealed glass tubes. Temperature of 95° F. kills in 12 to 24 hours; the temperature of 158°, in 10 minutes; a temperature of 212°, immediately.

The infectiousness of milk is stopped by souring, also by the fermentation attending cheese manufacture. Warming for one minute at a temperature of 185° F., 3 minutes at 176°, 15 minutes at 167° F. and 30 minutes at 158° F. destroys the virus.

The virus of foot and mouth disease is taken into the body through the digestive tract with food, water, bedding, litter, etc., which have become contaminated principally by the saliva of infected animals. Such intermediary agents as stable utensils, mangers, watering troughs, clothing and the hands of attendants, etc., may also harbor the virus. Railway cars, stock yards, cattle pens, manure, hides, wool, milk, veterinarians, butchers, cattle dealers, herders, dogs, pigeons, etc., are also carriers of the contagion. Hay, straw, feed and the like imported from infected districts often spread the disease. In 1908, foot and mouth disease was introduced into the United States by some calves used for the propagation of smallpox vaccine, which had been inoculated with contaminated vaccine imported from Japan. It is very probable that recovered animals may harbor the virus for an indefinite period, which accounts for sporadic outbreaks of the disease in uninfected districts—an argument against palliative methods of control.

While cattle are most predisposed, the disorder also attacks sheep, swine, goats and buffalo. It is rare in horses, dogs and cats, but does occur in these animals.

One attack produces immunity for only a short period (usually not over one year). In certain individuals no immunity is conferred, the animal suffering within a few months repeated attacks. Calves born of cows attacked in advanced pregnancy are sometimes highly resistent to either natural infection or artificial inoculation.

The period of incubation from natural infection is two to seven days, although it may be longer. After inoculations, it is 6 hours to 5 days; following inoculations into mucous membrane, 48 to 69 hours. The prodromal symptoms are those of fever, the temperature reaching 160° F. lasting one or two days, and falling to normal as soon as the vesicles appear. Unless complications arise from secondary infection, no further rise in temperature occurs during the course of the disease. For convenience the symptoms may be classified in to (a) Mouth and (b) Foot symptoms.

Mouth Symptoms—The mouths of the patients become sore, causing them to masticate slowly and in an interrupted fashion. Drooling (slobbering) is an important sympton. The mouth is usually held closed, foamy saliva hanging from it in long strands. When the animal opens its mouth a peculiar smacking sound is made. Where a number of affected cattle are housed together the noise produced is marked.

On examining the mouth one to two days after the beginning of the attack, the mucous membrane, especially of the

lips, gums, dental pad and tongue, shows a vesicular eruption, the individual vesicles varying in size from a pea to a walnut. The large blisters rupture in about one day leaving behind an excoriated surface of a brownish red color, which is often covered with a grayish deposit. The smaller vesicles persist for two to three days. On the back of the tongue one to three walnut-sized vesicles are often noted. As the organ is extremely sore and therefore little moved, the blisters of nasal mucous membrane, conjunctiva, pharynx and even the cornea are similarly involved.

Foot Symptons—The foot lesions induce lameness with knuckling of the fetlock of the limb attacked. If two or more feet are affected the patient lies down most of the time and is made to rise with difficulty. The coronet is hot and swollen, especially in front and between the bulbs of the heels. In some cases the swelling extends up the leg to the middle of the cannon. On

SHOWING FOOT AND MOUTH SYMPTOMS.

the vesicles remain intact for two to three days. The contents of the vesicles are clear and yellowish. When they erupt, a very sensitive, highly reddened, shallow erosion is left which becomes covered with new epithelium in two or three days. When healing is well under way the eroded area appears as a brownish yellow spot which eventually disappears. As soon as the erosions are sufficiently healed the now emaciated patient begins to eat.

In some cases the muzzle, (snout of swine) base of the horns (very rare), the second to third day of the attack pea to bean-sized vesicles appear in the swollen area. The vesicles rupture very early and leave behind ulcerous sores covered with a tough, brown scab. Healing usually requires one to two weeks. In severe cases, from secondary infection, exungulation of the claws result.

In swine and sheep only the feet may be attacked, no mouth lesions being apparent.

In cattle the skin of the teats and udder is often affected, most often the

former. The vesicles are from the size of a pea to a hazel nut and are generally soon ruptured during milking. The teats are swollen, sometimes phlegmonous (secondary infection) and extremely sensitive. Later the sores become covered with scabs and heal. Catarrh of the udder frequently attends the exanthema leading to changes in the milk, which becomes colostral, has an acid reaction, coagulates readily and is difficult to make into butter or cheese. The milk secretion will fall off from 40 to 75% in quantity.

The most serious complications are foot troubles, phlegmons of the digits which lead to suppurative inflammation of the tendon sheaths, tendons, joints and pododerm inducing severe general disturbance (fever, high pulse), inability to stand, decubital gangreen ("bed sores"), septicemia ("blood poisoning"), and death in one to two weeks.

Septic infection of the udder is not an uncommon complication which may cause the loss of a quarter or a half of the organ through gangrene.

Gastro-enteritis is a fatal complication in calves, leading to death in two to three days.

In most outbreaks the course is benign. Individual vesicles usually heal in five to six days, but as the vesicles do not all erupt at the same time, the duration is often extended two to three weeks. The mouth lesions heal more rapidly than do those of the feet. As all animals are not infected simultaneously, an outbreak will last in a given barn one to two months.

In calves (under two months) the course is more rapid and fatal, such secondary infections as toxemia, septicemia, pyemia, gangrenous pneumonia or heart's muscle degeneration leading to death in three to four days.

From resulting foot troubles (panaritium, suppurative tendo-vaginitis, open joint, interdigital ulceration), loss of flesh and milk (udder complications, the course is not only prolonged but the patient's economic value may become permanently reduced.

In typical cases, during the vesicular stage of the eruption the diagnosis is not difficult. The presence of vesicles, the foot lesions, the rapid spread of the contagion and the ease with which it may be transmitted artificially characterize the disorder. However, during the early stages (during the eruption) and at the end of a sporadic outbreak (vesicles healed or only secondary changes present), the diagnosis can be extremely difficult.

Foot and mouth disease may be confused with various forms of stomatitis ("sore mouth") in cattle, none of which are contagious, but some of which are attended with vesicle formation. The most important are the following:

1. Traumatic stomatitis ("tooth cuts" in calves) present lesions on the bars, lips and dental pad. There is no vesicle formation and the wounds which have sharp borders are deep. There are also no foot lesions.

2. Mycotic stomatitis of cattle, a non-contagious foot and mouth affection wide-spread in the United States. Vesicles rarely appear and are never well developed. The mouth lesions are more ulcerous in character than in foot and mouth and are more apt to involve the deeper structures. There is swelling of the limbs, but no vesicles occur at the coronets. The disease cannot be transmitted by inoculation and does not affect sheep or swine. Often only a few animals in a herd are attacked.

3. Ergotism produces gangrene of

the distal portions of the extremities (feet, ears, tail), the necrotic parts sloughing. Blisters are not common and when present not well marked. This poisoning is not contagious and cannot be transmitted artificially from animal to animal. It occurs only among cattle which have eaten ergot of rye.

4. Necrotic stomatitis is nearly always seen in calves ("calf diphtheria") and pigs ("sore mouth"). There is no vesicle formation, but a necrosis of the mucous membrane, yellowish patches developing in the mouth.

5. Foul-in-the-Feet of Cattle due to filthy stables and barn yards does not affect the mouth, there are no vesicles and no contagion. A malignant type of fout-in-the-feet due to the necrosis bacillus and appearing in cows soon after parturition or in advanced pregnancy, assumes the form of a **necrosis** of the interdigital space which may involve the deeper structures, (matrix, tendon sheaths, tendons, joints). It is attended by fever when secondary infection if present. The mouth is not involved.

The indications which point to foot and mouth disease in a recently recovered animal are: Ptyalism (usually profuse), yellow-brown scars or areas on the gums and dental pad, small red spots and erosions in the gums and borders of the muzzle. These traces are said to persist for several weeks.

The disease is benign except in very young animals, where it assumes a malignant form, and when complications due to secondary infection occur (loss of claws, decubitus, septicemia, etc.) It is rare for the mortality to exceed 1% in the benign type. It may exceed 50%, however, in the rarer, malignant type.

In Man—Human beings, while they possess a good deal of resistance, nevertheless, may be infected with foot and mouth disease. The infection is usually due to **drinking either raw or unsterilized milk** of diseased cows. It is possible that such products as cheese and butter may be sources of infection. More rarely are persons infected from direct contact with diseased animals.

The disease in man usually assumes a mild form, except in children, who not infrequently die from gastro-intestinal catarrh as a result of the attack. Occasionally adult persons are severely affected.

The symptoms in man following the use of raw infected milk are the following: In the beginning there is fever, vomiting, a feeling of warmth and dryness in the mouth, the mucous membrane of which, especially the lips, gums and cheeks becomes highly reddened. Later there appears in these regions and sometimes on the border of the tongue vesicles about the size of a pea. The vesicles rupture leaving erosions which soon become covered with epithelium. In exceptional cases the eyelid is involved. Skin eruption has been noted, appearing most often on the hands at the point of the fingers, base of the nails and the volar surface of the finger tips. Very rarely are the toes involved. An eruption on the face is also rare.

Besides these local changes general symptoms occur in different cases, such as headache, pain in the limbs, dizziness, stomach cramps, vomiting, diarrhea and great general depression and languor.

The Present Situation—Foot and mouth disease in **malignant** form has already been reported from the state of Montana, Michigan, Indiana, Ohio, Illinois, Iowa, Wisconsin, Pennsylvania, Maryland, Rhode Island, New Jersey

and New York. In Ohio the existence of the disease has been reported in 44 counties.

The origin of the outbreak has as yet not been fully determined. It is supposed that a shipment of hides from South America to a tannery in Niles, Michigan, carried the disease in the United States; the Ohio outbreak is attributed to anti-hog-cholera serum contaminated with foot and mouth virus.

While the chances are that the drastic measures adopted by our Government will eradicate the disease within a few months, the responsibility of its further propagation is great. The experience in older countries show foot and mouth disease to be remarkably tenacious. Germany has been fighting it for one hundred years and in 1912 suffered their greatest epizootic from this source. To be sure that methods of control employed on the continent, due to the widespread presence of the disease, causes the sanitary officials to adopt palliative rather than radical measure of control. On the other hand Germany is a small country, not so large as the state of Texas, and has a wonderfully developed system of veterinary police.

The damage which foot and mouth disease can do to cattle, sheep and swine industries of this country is enormous. In the United States there are 59,471,000 cattle, 60,221,000 swine and 50,110,000 sheep. In Germany there are only 20,182,000 cattle, 21,824,000 swine and 5,803,000 sheep. It is estimated that the damage which foot and mouth disease did during the year 1912 in Germany amounted to almost $100,000,000. As we have in the United States practically three times as many cattle and sheep and ten times as many swine as there are in Germany, it would take only a slight knowledge of mathematics to compute the possible losses to our live stock industries.

Treatment and Prevention—In America where the disease is, we hope only a visitor, treatment should be attempted only in exceptional cases (extremely valuable herds). There is no specific treatment for the disease. Proper care, good sanitation, the liberal use of antiseptics and the local treatment of complications are all that can be done. As yet no vaccine or serum has been developed which more than mitigates the disease.

The plan of eradication adopted by our government, as noted, is most drastic, but after all the only thing to do in the face of this serious situation. The method is extremely simple: (1) A thorough inspection of all suspected herds is made by an expert to determine whether or not the disease exists among them. (2) All cattle, sheep and swine or other animals found with the disease are immediately killed and the carcasses either burned or deeply buried. (2) A thorough disinfection of the premises follows, so that the virus may be entirely annihilated. Only by these means will it be possible to stamp out the disease. The great danger lies, since this policy has been adopted, not in the known cases of foot and mouth disease, but where either through ignorance or avarice cases are kept hidden. In a country, such as ours, unaccustomed to the military discipline of Europe, the co-operation of the people is necessary for the enforcement of sanitary laws.

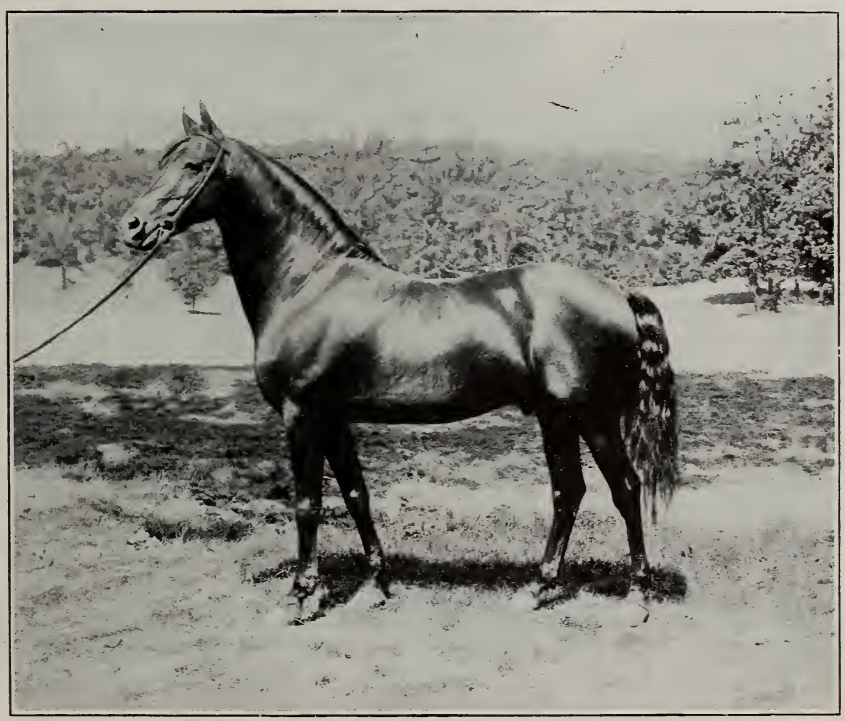
Therefore, let each one put his shoulder to the wheel and help to sow the seeds of information and intelligence which will form so great a factor in ridding our country of this unwelcomed guest.

BREEDING OF HORSES BY THE U. S. GOVERNMENT

G. A. BELL
Senior Animal Husbandman, United States Department of Agriculture

THE funds made available by Congress for the breeding of horses has enabled the Department of Agriculture to conduct work along three main lines.

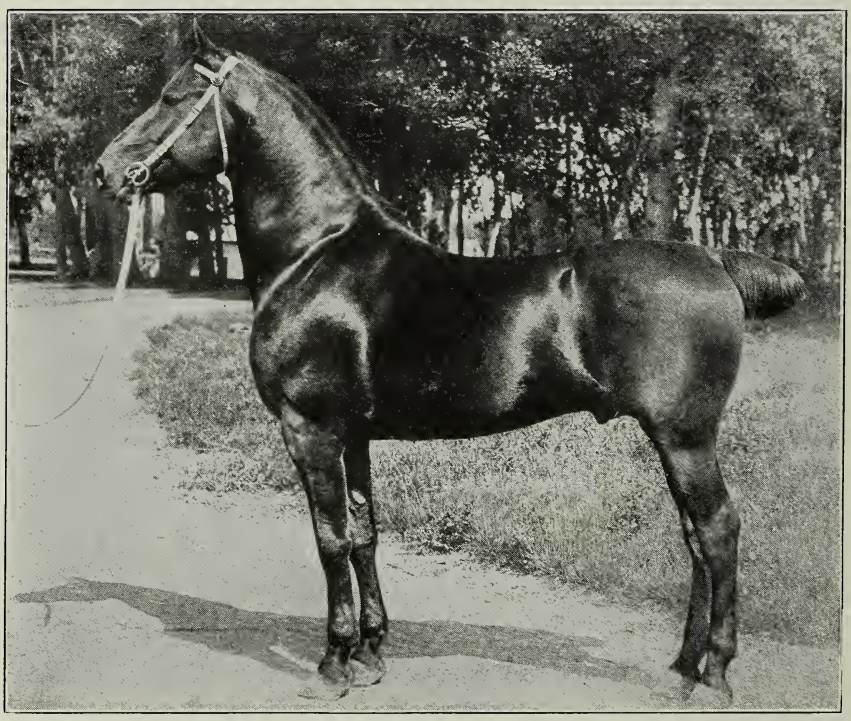
Two miles from Middlebury, Vermont, is located a farm of 435 acres which was presented to the department by Mr. Battell. On this farm our government is breeding Morgan horses. This breed has been noted for its great endurance and stamina and for all-around road work has no superior. The one objection raised against this breed is the lack of size to fulfill the market requirements. There is no doubt that a number of the Morgans are too small, but that Morgans standing more than 15 hands in height and weighing over 1,000 pounds and still possessing the characteristics which have made the breed famous are being produced is evidenced by the large number of Morgans of that class seen in various parts of the country. In the department's work at the Morgan Horse Farm the demand for larger horses has been given careful consideration without sacrificing the Morgan characteristics. The stallions at the farm are available for public service and nine of the stallions were stationed in various localities in Vermont and New Hampshire during the 1914 breeding season, thus



GENERAL GATES,
At the Head of the Morgan Horse Stud, Middlebury, Vermont.

enabling the farmers to breed their mares to these stallions.

At Fort Collins, Colorado, in cooperation with the Colorado Agricultural Experiment Station, a breed of horses suitable for carriage and general work is being developed. The animals in the stud are trotting-bred and the stallion at the head of the stud is Carmon, a registered standard-bred.



CARMON,
At the Head of the Stud at Fort Collins, Colorado.

Carmon is a beautiful bay stallion 16 hands high and weighs 1,300 pounds. He has sired some excellent animals. One of these is the stallion Albion, which is 16¼ hands high and weighs 1,370 pounds. Albion is a bay stallion of good conformation and excellent action. These two stallions are available for public service at Fort Collins. Two other stallions which have been bred at the station are located at other places in Colorado and one in Wyoming. Last summer Mr. C. K. Billings presented to the government his famous standard-bred stallion Wilmering 48569. This stallion was sent to the Colorado stud and should prove of great value in that work.

For the fiscal year of 1913 funds were made available by Congress for the production of horses suitable for military purposes. This appropriation was primarily made because of the shortage of horses suitable for the army, but in connection with this work the general horse markets were kept in mind. A number of the best stallions of the light breeds were purchased and others were donated by breeders interested in this work. These stallions were sent to various localities for the purpose of improving the horse stock

and for making available a supply of suitable remounts for the army. During the breeding season of 1913 a total of 41 stallions, consisting of 7 Morgans, 9 saddle stallions, 10 Standard-breds and 15 Thoroughbreds were placed in the states of Vermont, New Hampshire, Virginia, West Virginia, Kentucky and Tennessee. During the season of 1914, 43 stallions were available.

For convenience in administration the six states have been divided into three breeding districts, the first comprising Vermont and New Hampshire, with headquarters at Middlebury, Vt.; the second comprising Virginia and West Virginia, with headquarters at Front Royal, Va.; and the third comprising Kentucky and Tennessee, with headquarters at Lexington, Ky. During the 1914 breeding season 9 Morgans were located in the first district; 3 saddle, 5 Standard-bred and 15 Thoroughbred stallions in the second; and 6 sadde and 5 Standard-bred stallions in the third district. The exact locations of the various stallions depended on several conditions, such as the demand for such stallions in any particular locality, whether or not there were suitable stallions in that locality and the number of mares of a type suitable for the production of army horses.

The owners of sound mares of a suitable type were allowed to breed such mares free of charge provided they gave the government an option on the foal during the year such foal is three years of age at $150.00. The owner signed an agreement to that effect with a clause permitting the cancellation of the option by payment of a service fee of $25.00 at any time before the foal reaches the age of three years. That the plan has met with approval by the farmers is evidenced by the fact that more than 1500 mares were bred during 1913 and over 2000 in 1914.

The fact that this experiment has been in operation less than two years renders it impossible to state definitely just how valuable it will prove. It is evident, however, that breeding for a number of years to pure bred stallions that are free from hereditary unsoundness will result in great improvement to our horse stock. The standing of high-class stallions of the same breed and type in a community for a number of years will result in fixing the type and will thus enable the farmer who owns but a few mares (often but one) to breed for a particular type. The production of a large number of horses of one type in that community will enable the producer to command the best market price. It is evident that if buyers can go to a community and produce a large number of horses of a definite type it will result in attracting several buyers to that locality.

It is not the purpose of the department to enter into the active production of horses in competition with the breeders and farmers. The aim is to encourage the production of better horses in order that the farmer may have not only better animals for his own use but also to supply the home and foreign demands.

At Christmas tide the open hand
Scatters its bounty o'er the sea and land.
And none are left to grieve alone,
For Love is heaven and claims its own.
—Margaret E. Sangster.

CONSIDERATIONS IN FARM MANAGEMENT

H. P. MILLER
Contributing Editor of The Ohio Farmer

FARM management is distinguished from both business skill in the execution of farm work, and scientific crop and stock production. It includes consideration of the economic size of farm, size and shape of fields, the adaptation of crops to soils, size of farm and field, and contour of land, the proportion of land to be kept under cultivation, the rotation of crops, markets and transportation facilities, the kind and amount of stock to keep, the form of product to market; the proportion of fixed and operating capital and the amount of labor to employ and of work stock to keep.

Farm management considers the entire farm enterprise as a unit and strives to so relate the various enterprises with reference to the farm itself, its location, and the working force and capital available, as to secure the largest net income during a series of years, and not impair the productive capacity of the farm.

There is a strong contrast between skillful farm management and expert crop production, or stock husbandry. Quite as important as skill in selecting and testing seed corn, wisdom in the preparation of the seed bed and in the technique of cultivation, is the determination of the adaptability of the farm to corn growing, and to what extent it should be grown. Even though corn growing may be profitable, potatoes, beans or tomatoes might be more so, hence corn growing would be unwise. Even more important than skill in feeding steers is the determination of the relative profits from feeding steers and cows.

In our intense desire to increase returns per acre and per animal, the cost of production and adaptability of products to markets have been overlooked. Amount of production, rather than low cost of production and net profits to producer, has been the burden of thought of the agricultural press, colleges and station, since the movement for the improvement of agriculture began. Somewhat recently we have come to see there are many other phases to the farm problem than that of production, and as we have come to study the whole problem in detail we discover that some of the heretofore neglected factors are really important ones. For instance size, shape, contour and distance from barn of corn field are important factors in determining cost of production of a bushel of corn; the continuous employment of men and teams is an important consideration in determining the acreage and kind of crops to be grown, and their adaption to markets as well as soils must be considered.

The size of a farm is a larger factor in determining the labor income of the farmer than has been generally supposed. Somehow the sentiment "A little farm well tilled" got afloat and without doubt has had some influence in keeping down the size of farms below what experience and investigation have shown to be the economical size, that is between 200 and 300 acres. Again the strong desire for land ownership has prompted many a man with small capital to buy a farm, 40 to 60 acres, when he would have used his capital far better in farm equipment and rented 3 to 4 times as much land. Very little more machinery is required

for a 250 acre farm than for a 50. Again two or three men can accomplish more working together than working independently. And further, upon the farm large enough to warrant the keeping of four or more work horses there are many operations in which one man can drive 3 or 4 horses thereby increasing the efficiency of the man labor.

As hired help can be employed more cheaply when given steady employment throughout the year the separate enterprise should be selected with a view of giving a somewhat regular amount of work throughout the year.

The maintenance of fertility being requisite, the marketing of a large portion of the field crops though livestock presses for consideration. Then as each species of animal is subject to a special scourge, and each kind of animal is subject to market fluctuations independently the advisability of diversification in livestock is to be considered.

The production of a crop or the feeding of an animal may be done by rule but the management of a farm requires the broadest comprehension of data both upon the farm itself and of every factor affecting market prices.

DUNDEE,
Morgan Stallion at the Government Farm, Middlebury, Vt.

THE WORK OF THE MIDDLE WEST SOIL IMPROVEMENT COMMITTEE

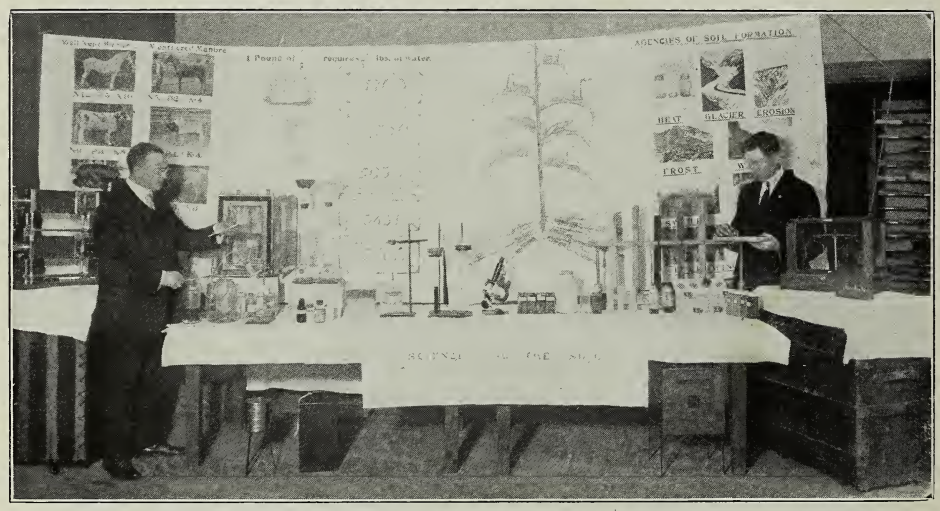
J. W. HENCEROTH, '14

BELIEVING that an organized campaign, with the object of increasing yields and bettering the quality of farm crops, would result in lasting good to agriculture, as well as to all allied industries, the National Fertilizer Association organized and established the Middle West Soil Improvement Committee at Chicago in September, 1911.

Henry G. Bell, formerly Professor of Agronomy at the University of Maine, and Assistant Professor of Farm Crops at Iowa State College, was placed in charge of the bureau. Prof. Bell's training and experience had eminently fitted him for developing this new type of agricultural extension work.

The chief object of this movement is to encourage more desirable methods of growing larger and better crops at a lower net cost per acre, of building and maintaining soil fertility by rotation of crops, by drainage, by proper use of lime where required, and by the use of barn manure and legumes, supplemented by suitable fertilizers properly applied.

The work of the bureau has included co-operation with agricultural and commercial organizations, state colleges of agriculture, normal and high schools, and agricultural experiment stations, issuance of bulletins and pamphlets dealing with fertility maintenance and crop production and general publicity of successful agricultural methods.



PRACTICAL SOIL FERTILITY DEMONSTRATION FOR PRACTICAL FARMERS.

Co-operating whenever possible with all organizations in any way connected with agriculture, in the belief that there was a proper and legitimate place for an educational bureau with such an object, the work was launched with the following creed: "Experience has shown that the right use of fertilizers, barn manures, proper tillage, good seeds, crop rotation and liming when necessary, insure farm prosperity."

The latest and most reliable infor-

mation, both American and foreign, on various phases of crop production and soil fertility, is compiled with the object of placing it before the farming public and others interested in agriculture. Not only is the scientific field invaded for information, but we also go directly to the best farms to study methods and practices in vogue. Thus we endeavor to reconcile the latest teachings and scientific discoveries with actual farm practices.

The office has gotten out some nine bulletins, eleven pamphlets and many short letter fillers, besides numerous articles for the farm press. A service page dealing with timely and seasonable subjects is issued, and bimonthly news letters will be sent to local papers of the Middle Western states. Addresses are given at farmer's meetings and conventions in various parts of the middle west, as well as before organizations of railroad and business men closely and vitally interested in some phase of agriculture, either directly or indirectly as it affects their business.

At present, a new line of extension work, called "Science and the Soil" is being developed. It is our object to demonstrate the principles that underlie the maintenance and building up of fertility, the production of various farm crops, and to show the basic facts concerning the same. The work consists of three lectures; the first dealing with soil physics; the second, plant-food in soil; the third, an illustrated stereopticon lecture on "The Manufacture and Use of Fertilizer." Every phase of the work is illustrated by equipment that includes the latest scientific apparatus used by leading soil scientists in addition to considerable original material. This work is typical of the various activities carried out by the office. Efficiency, reliability and practicability are ever kept in mind.

The author took up work with the office immediatly after graduation. Clyde A. Waugh, '12, formerly Associate Editor of The Ohio Farmer, is with the office as manager of the Editorial Department.

It is from the class of men represented by the readers of **The Agricultural Student** that the future leaders in agriculture must be recruited. It is with the hope of giving such men an idea of the object, type and class of work that is being put out by the service bureaus of our various corporations that this article is prepared. If a few get a better understanding of this type of work and its place among the many educational agencies of our land, our effort will not have been in vain.

THE FOURTH OHIO STATE APPLE SHOW

H. PENTON, '16

THE Fourth Annual Apple Show of the University Horticultural Society, which was held on December 3 and 4, was the most successful ever witnessed on the Ohio State campus. It has held in the new Horticultural Building and served to introduce many people to this, the latest addition to our agricultural buildings.

The number of exhibits excelled those of any previous show; there being about 550 plates and about 30 trays. The quality of the fruit shown was excellent according to Paul Thayer of the Ohio Experiment Station, who judged the exhibits. Practically every variety grown in Ohio was represented, while typical specimens of Ohio Varieties were shown by the Experiment Station.

Competition for the various premiums was very keen, most of the students in horticulture having entries. W. W. Ellenwood took first honors among the student exhibitors, winning the sweepstakes cup presented by President Thompson. C. M. Ochs was a close second, taking a great many of the prizes in the student classes. Among the growers Guy Kesler took the sweepstakes prize, of a cream separator offered by the Rumley Products Company. The premium list comprised over $350 in cash and merchandise, which was one reason for the popularity of the show.

Besides the above exhibits, however, there were a number of other instructive and interesting features. The Department of Home Economics showed more than twenty different methods of serving the apple on the table, and visitors were given samples of the product. Clifford Runyan and P. B. Wiltberger presented a very extensive collection of apple diseases and insect enemies, and told how to combat them. Dean H. C. Price presented samples of apples, packed under the Agricultural Commission's Certificate, and shipped to the Columbus market where they had been placed in storage. The Foresters constructed a log cabin, around which they displayed the tools of their trade. The most popular feature, probably, was the hydraulic cider press, where the juice of "Malus Malus" was extracted and served while the customer waited.

The attendance at the show was estimated at between three and four thousand, a large increase over previous years. It is hoped that this will be the beginning of a movement to place the work of the Department of Horticulture before the people of the state. It certainly shows a fine spirit among faculty and students, when the work of staging such a show is considered.

Winter days! O grim and gray!
When silent skies come dropping down
To meet the fields of white that lay
O'er fields that erst were fields of brown;
And draw the drapery of their shrouds
Across the brow of brooding hill,
And canopy, with leaden clouds,
A leaden landscape, cold and still.

BEAUTIFYING THE HOME GROUNDS

L. B. PIERCE, Tallmadge, Ohio

AS I look out of my window toward the south along a considerable stretch of highway I see in my large door yard just to one side a small maple tree. It is oval in outline, something the shape of a naval orange and about eight feet high. It is very likely 15 or more years old and was transplanted to its present place six years ago from a neglected fence row. I was attracted by a variation in the foliage in the spring months and put it in a group of shrubbery to watch its value at close range, expecting to plant it in a permanent location should it prove sufficiently distinct to warrant keeping. It was not, but it developed a habit of coloring very beautifully in the autumn, even when the season was unfavorable. The present season was such a one, yet this tree is a beautiful bouquet of bright color shading from old gold and yellow to brown with splashes of crimson. It stands where a big tree would cut off the view up the road, so three years ago I began to experiment in keeping it down by a severe cutting back each spring. A Japanese student whom I questioned on the subject of dwarfing trees told me that the annual cutting back would result after a while in a very small growth and perhaps dwarf it permanently.

This tree is an illustration of the more prominent and valuable features resulting from ornamental planting. First, being native adapted to the soil, it will prove hardy and there is little risk of loss in the first investment of procuring and planting. Second, it has a distinct beauty which may be relied upon to repeat itself annually just as a rose or peony does in blooming.

The group of shrubs referred to are so planted as to leave a clear vista upon the west along the side of a green house, so one can see up the road from the south window of the house. There are four double lilacs, each different, whose bloom covers three weeks; there are three rows of weigelias, one being very distinct having blood red flowers and blooming a little later than the pink ones. Then there are two plants of the Thunberg Spirea. This is a delicate little shrub with fine cut foliage and white bloom and earlier to blossom than the lilac. Unlike some shrubs, its foliage is beautiful all summer and turns to a golden brown before dropping its leaves. For a very small yard it should be the one shrub to plant. Other shrubs for small places are the blood colored Weigelia, the flame colored azalia mollis, and the weeping dog wood.

It is difficult to give any iron bound rules for ornamental planting as each home requires a different treatment. Since door yards no longer have street fences there is no call for planting in close groups on the road fronts, except on lawns of considerable size where the house is one hundred feet or more from the sidewalk. As a general rule begin to plant at the house foundation, devoting about two feet wide to a flower border on such sides of the house as may be desirable. Where a path skirts the house at a distance of two feet or more, low bedding plants of all summer beauty should be planted. On the other side some permanent planting may be made with peonies, acquilegia and other plants which grow from year to year where a lawn extends around an open

corner of the house a group may be planted, commencing with one bush and extending diagonally outward by adding others. Even a single bush growing close to the corner gives character to the place.

It is not necessary to call in an expert to improve most of the home surroundings. If one really wishes to succeed he must cultivate a love for the beautiful as seen in a great many growing things. A person cultivating a desire to study plants, to notice their excellence and their adaptation to various combinations of soil and environment is much more likely to succeed in beautifying a door yard than one who does not know the difference between a pear and an apple tree or two varieties of maples. The object of ornamental planting should be two fold; one to make a place more beautiful; the other, educational. Most persons go through the world entirely blind to the wonderful and interesting work of Nature constantly going on in the production of fruit, flowers, grain and vegetables. Some day those who teach will learn to start the children with studying the things beside the paths instead of with wooden blocks and pictures. Plants not only interest one in the study of light and shade and color, but in geometry and mathematics as well. Architects and painters go to the plant kingdom for models and for illustrations and the little child takes kindly to all flowers from the little dandelion to the towering, gaudy sunflower.

I have two little grandsons, whom I have found comparing flowers and discussing how they differ, in the green house. Each day all summer they find time to visit the flower beds and are quick to note the difference in flowers and plants.

The house is the picture,
The grass is the canvas,
The trees represent the frame.

If you contemplate beautifying your home with either ornamental or useful flowers, the time to begin is now. I am writing a few weeks before Christmas, and I see in the newspapers and stores the somewhat slangy advice, "Do it now." The same advice is admirable during the greater part of the year. There are yet a few bulbs unbought at the seed stores which may be planted, even if a crust of frozen earth must be removed.

FARM LIFE IMPROVEMENT

VICTOR HERRON, College Hill, Ohio

IN these days when we are maintaining our state agricultural experiment station, establishing our county experiment farms, when our agricultural colleges are crowded with students, and even our small rural schools are taking up agricultural work, it seems almost superfluous to try to talk on the improvement of farm life. Farmers in every community have their individual problems coming up, which are not touched upon by any of the agencies mentioned.

It is a long step from the agricultural college to the common life of the actual farmer, who learns his valuable lessons in the school of experience. Farm life improvement is as yet only in its infancy, as we are just beginning to awaken to the fact that there is more to farm life than merely following the routine our forefathers did. Farm life was easiesr in those days for mother earth was in her virgin state. They could easily raise the corn, wheat and oats on their rich new ground and they did not know they were robbing their descendants, when they were selling these raw materials which were depleting the land very rapidly. They were not careful to restore to this virgin soil the same amount of fertility in some form, of which they were robbing it. They did not know that each ton of timothy hay sold from their farm robbed the soil to the value of five or six dollars, that a ton of wheat robbed the soil of even more of its commercial value.

Oats and straw were also robbers of the soil whose value was not easily replaced. Especially is this true around large cities where the markets are convenient and they draw all such products from the surrounding country and I think I make no mistake when I say that the improvement of farm life must begin with the improvement of the soils.

The cities have not only drawn on our crops and depleted the soil but they have drawn on our people at an alarming rate. The ratio of population on the farm today is the lowest in the history of American independence. What would the Father of our Country think if he were to come back and find that the agricultural population of his day which was 96 in 100 had dwindled to 52 in 100 in our day? Everywhere the urban population is increasing above the rural until in 1910 it had fallen to 35%. The resources of our soil and climate are limitless and unsurpassed by any other country in the world yet for some reason our young people are escaping to our towns and cities. Why is this? Simply because the attractions are greater than in the country. From where do the young men come who are attending our agricultural colleges? Would you be surprised when I say that a very large per cent come from the city? This year 44% are from the city and 56% from the country in our agricultural college. The great question of the hour is to ascertain the great cause which has upset the co-ordination of these two important parts of our civilization.

Whenever the production is below the demand, we may expect turmoil between the two elements concerned. The urban population is aroused to much concern over the relative cost of all products from the agricultural world and are endeavoring to give aid by assisting in ways congenial to them.

Since I have said that the improvement of our soils is the first step to the improvement of farm life it is now within the reach of all to know how to accomplish this. Carlyle has said "Man know thy work; then do it," and in this age we certainly can know it, for has not our great state of Ohio seen the value of this and has done a great deal of good by establishing our State Experiment Station at Wooster and now is placing sub-stations in our counties and bringing the very best results from Wooster and demonstrating them in the

GOOD BUILDINGS BESPEAK FARM IMPROVEMENT.

counties where every farmer can visit and see for himself the results of this work. Bulletins are also sent out from the main station and also of the county station which if studied would be of great value. Never in the history of our country has farm literature been so cheap as it is today. Good weekly papers abound and are within the reach of all. Now can anyone rightfully say he has no way of knowing how to improve his land when so many ways are open to us?

While I think if we have a productive farm, improvements will rapidly follow, yet something must be done to make life worth living while we are doing it, and the grange in a great many places has come in and done more for the farmer than any other organization. It has brought the rural delivery. It has brought parcel post and we have operative systems which can and will improve as its usefulness is understood. It has been instrumental in the organization of women's clubs where farm women may meet to discuss methods of improving their social and economic interests of life.

In reading the advertisements of farms for sale we almost always notice they say if possible, they are situated close to school and chuch. Why do they say this in preference to something else? I never saw one read "close to a good saloon." A good school and church are great drawing cards in the selling of any farm, for they are the stamina of farm life. A great cry has gone up lately that our rural schools are retrograding, that our country teachers are back numbers. Are the modern ideas coming into your school? Do children know more about the birds, the soil, trees and weather? Are the little district schools able to cope

with all these questions or are they to be swallowed by the centralization of schools?

The small country mill has disappeared. The large mill in the town can do better work. It can economize and organize all the forces that go to make up a good mill. Likewise the small isolated country school will in time pass away. The isolated forces will be gathered up into consolidated schools. One school of sixty pupils can be maintained more cheaply than two schools of thirty pupils each. The country teacher must handle everything from alphabet to physiology, from poetry to algebra. The long hoped for nature study, agriculture and other vital things cannot come effectively until a school has more than one teacher.

The same seems to be true of our country churches. Over this great state of Ohio are almost 800 empty churches, fit monuments for past usefulness. But you say the church is interested in only one phase of life, and what can they do towards the improvement of farm life. On August 6, our Hamilton County Experiment Farm was visited by a delegation of 100 or more persons from New Haven. While great progress was being made for years, with the coming of the present pastor, Rev. O. D. Wellburn, the highest degree of improved farm life is being obtained. He has established a cooperative buying and selling agency, has brought lectures on the many phases of human life, has organized a successful boys' club and farmers' institute in his church. While in him we see an organizer and leader, we see back of him an earnest body of men and women who are full of the spirit of self improvement and social uplift.

What has been done in this little village could be duplicated many times if more of our country ministers knew a little more of the leading industry of the community. I am sure that if Christian people get such a vision, and with consolidated schools a great service will be done toward the betterment of rural life.

But there is something else that is of interest to the betterment of farm life besides the productiveness of the soil, the improving of our schools and churches and that is the buying and selling of our farm products. Upon the average, the farmer gets only 35c of the consumer's dollar. Look at the enormous price you pay for steak, yet the packers pay the farmers for their cattle but little more than they did several years ago, when butchers' meat was very much cheaper. The vegetable and fruit grower get the smallest part of the consumer's dollar, which is only about 20c. It is the meager share the farmer receives of the great wealth which he produces, that helps to depopulate our country and cause dissatisfaction.

I have spoken of several ways for the improvement of farm life, and have not yet mentioned one that is of vast importance to a great number of our people, and that is the improvement of our country roads. People who live in sections of Ohio where good roads are prevalent do not know how to sympathize with those who are "mud-bound." The winter season is about the only time the farmer has to enjoy social life. And then he is hindered by the bad condition of the public roads. Every dollar expended in encouraging road building is a distinct contribution to the welfare, comfort and happiness of the people of the state, for they will make possible the three great links of civilization, the model home, the model school and the model country church.

After all is said and done the improvement of farm life depends mainly on the individual home life, for this is really the hinge of the whole matter. If husband, wife and children are united in one individual family and all working in unison, this is really what makes the state what it is. Sec. A. P. Sandles had for the motto of the corn boys on their great trip to Washington "The rainbow comes down in Ohio" and it seems to be literally true for here we have a pot of gold in the form of golden opportunities. I have traveled across the continent to Washington and California and came back with the notion that if we cannot live in Ohio we cannot live any place, for we have in this state all the resources and conditions for a prosperous and happy country life. With as good soil as can be found anywhere, with better markets, and other economic conditions than are found anywhere else, with a people for friends and neighbors, with good schools and better ones coming, why should any one wish to leave Ohio? Let us boost our state for more scientific agriculture and all else will follow.

THE HOME COMMUNITY AND THE AGRICULTURAL GRADUATE

REV. IRA G. McCORMACK
University Pastor

THE college of agriculture has now reached a place where it is universally recognized as the most essential factah in the right development of agricultural interests. It its rapid advance it has needed and still needs many of its best graduates for instructional work of various kinds. This fact has been noted with some regret by the true lover of the farm, for it has been hi sopinion that the best are none too good to return to the native soil and ther make a practical demonstration of the knowledge they have acquired in the school. And it is a matter of general observation that in the alst few years there has been a keener sense of obligation on the part of the tsudents to do this. For instance, the writer knew personally, this past spring, of a goodly number of the graduating class of the Ohio college of agriculture who turned down splendid and lucrative positions in order that they might go back to the farm.

This feeling of obligation might be roughly divided into two parts—personal and communal. There is the pull of home associations—the family tie, the dependence of parents and the seeming need of making some proper return to the old place and its dear ones for the opportunity and advantages of an education. These personal considerations loom large with the average student. Now turning to our second reason, we find it varied in its appeals. Some men, I presume, go back to the farm or some farm as simply the natural thing to do. They have prepared to farm and perforce must have a place to do it. To such, waiv-

ing personal issues, the community appeal will only be a consideration of the fertility of the soil, the market facilities, etc. But the average student, in this age of social impulses, would see more than the above. In his return either to the home place or to any other location, he would be filled with the thought of service for every community good.

The most difficult problem to such a man is ohw to render such service. While it is true the communities differ most decidedly, yet huamn nature is largely the same everywhere, and it is here that we touch the most vital factor in community service. And it is largely from this angle that we offer the following suggestions. There is an old quotation that "silence is golden" and it is never more true than here. Much talking will undermine the growth of the graduate's influence and ruin his chancse of leadership. He must remember that he is dealing with hard-headed, practical farmers who will resent theoretical instruction. His must be the instruction of results. And if he can quietly demonstrate that the practical working of his school instruction pays out in cold coin, his leadership in every realm of community interest will be accepted. His silence is largely ended and he may now speak as one having authority. This process of making good is absolutely essential to his further service.

Now during these years of silent demonstration of the most scientific and best methods of work he may also be laying other bases of influence and leadership. G. Walter Fiske, in the "Challenge of the Country," says that "it is to the country church that we must look to save the country." Other authorities concur in this opinion. So the local church offers a fine opportunity for service and the development of leadership. And the more decadent it is and the more inefficient, the greater the opportunity. I recadl this instance: In a fine little village in eastern Ohio the church was unable to hold its young men. The graduated out of the Sunday school and not into the church for the most part, and, those who did join the church, wer never active in its work. One of their companions returned from the university. He took his rightful place in the church, he taught a Sunday school class and later becamc the assistant superintendent of the school. The immediate effect of all thi swas a new birth of interest on the part of the other young men of the village and a new enlistment of their services in the church. So by this participation in the local church he began to spread a gracious influence and to lay the foundation for future helpfulness in that community. Then, too, the student should manifest a lively interest in any movement for good of any kind. He should plan his schedule so as to have ample time to attend institutes, grange meetings, picnics, etc. And he shoul dgo in the spirit of a helper, and when called upon to render any service at these meetings should promptly respond to the call. Thus he will show a spirit of co-operation which is one of the great needs of the country.

This paper is necessarily limited. It has only touched on a few of the fundamental relationships and duties involved. But its purpose is accomplished if it brings, in any degree, a vision of the proper relationship that should exist between the agricultural college graduate and his community. What a field fo service lies before him! What an opportunity!

FOLLOWING THE MOUNTAIN SHEEP

PROF. C. S. PLUMB
Ohio State University

IF one has a love for the everlasting hills, and I confess that I have, and he follows the trail northward from England into Scotland, he will come into a land where hills rise to the statue of mountains and where sheep are as much a part of the landscape as the hills themselves.

In the northwestern corner of England, in the counties of Cumberland and Westmoreland, dignified mountains and lovely lakes combine to make the famous English lake district one of the most beautiful spots of Europe. Here the hand of man gives an added touch of beauty to the scenery, in picturesque village and town, in attractive country villas and model highways.

Dotting the grassy mountain sides of this English lake country are to be seen small flocks of a breed of sheep almost absolutely unknown in America—the Herdwick. This is one of the small breeds, the males ornamented with horns and covered with a rough coat of inferior coarse wool, varying in color from dirty white to mottled brown or black and white. As one drives about the country, flocks of fifty or so are common everywhere. The sheep show much variation in color. Brown or black individuals are not rare, the lambs are often parti-colored, becoming white with maturity. Yet one frequently sees mature Herdwicks with mottled faces and fleeces that show both dark and light locks in striking contrast. These are among the hardiest sheep in Europe, nimble of foot to a degree and furnishing mutton concerning which the butchers of Windermere sing the loudest praise. Australian refrigerator mutton is common stuff, compared with the native mutton of Cumberland, which surpasses all in delicacy of fiber and flavor, we are told. Lydekker refers to a strain of Herdwicks that possess fourteen pairs of ribs instead of the usual thirteen. A few of these sheep have been introduced to America within the past year, but their small size, inferior wool, and slow maturity, do not justify giving the breed recognition here. In England, however, it is quite another matter, and no doubt, they fill a special place in the rural economy of the hills glorified by Wadsworth.

It is a pleasant journey by rail from Windermere to Carlisle and thence through the border country, up over the grass-capped, ever beautiful Cheviot hills. These are in fact, more than hills, for the main Cheviot looms up against the horizon some 3600 feet. In every direction lies a wide stretch of pastures, and over these are scattered flocks of perfectly white sheep. These are the famous white Cheviot, proud of carriage, bold of eye, always alert, perhaps the most beautiful sheep in the world. Among the wider sweeps and more lofty reaches of the Cheviot hills, houses are few and far between. There are no fences, and stone walls, and these usually about the buildings, which are located in the sheltered valleys. The shepherds here count their sheep by thousands, and pay land rent, not by acreage, but by sheepage—that is by the number of sheep they carry. Over these hills graze the sheep, not in flocks like the Merino, but each sheep drifts about and grazes in complete independence. The shepherd depends on his dog for invaluable assistance,

and with his aid remarkable feats of driving and sorting out are accomplished. While the Cheviot is the common sheep over the wide range in tihs border country, he has a companion in the Border Leicester, which is found in the lower levels of the hills. The mating of Border Leicester rams on Cheviot ewes furnishes the Scotch and English markets with some of their choicest mutton.

One may enter the Cheviot country from Berwick-on-Tweed on the eeast, from Carlisle on the southwest and from Edinburgh on th north, and in each case the iron roads winds through the beautiful valleys, following crystal streams of water, stopping here and there at beautiful mountain towns and villages, noisy with the hum of the machines in the woolen mills. The tourists often follows the line of greatest travel which may be beside the rippling Tweed, or of the brawling Jed or the picturesque Teviot. The tourist seeks Melose Abby and Abbotsford and other spots famous in Scotch history, but he rarely sees the land of Scott outside of the beaten track. He does not see the Cheviot in all his glory and in all his loneliness, even though he may truthfully say that he saw sheep everwhere on a thousand hills.

The Cheviot has not only found its way over the border country but among the hills in North Scotland, this breed is also counted in great numbers.

If one is driving through the Scotch lake country, a land made famous in story and song by Scott, a land noted for beautiful mountains and crystal lakes, he will see on the higher reaches a small rough fleeced horned sheep, grazing now on grass and then on heather. The face is black, or largely black with some white spots, the horns of the males are large and graceful of twist, while the fleece is coarse in the extreme, even to the point of hairiness.

If one is following the sheep in Scotland, then time permits, he should endeavor to attend the annual show of the Highland and Agricultural Society. This year of 1914 it was at Hawick, a woolen manufacturing center in the Cheviot country. The Highland show is always of interest on account of its distinctive Scotch character. The animals shown are all Scotch, excepting the Sharthorn, and make up most interesting exhibits. The Scotch shepherds were in their glory this year at Hawick, for unusually large entries of Cheviots, Border Leicesters and Black Faced Highlanders promoted the keenest of rivalry. The exhibits were very choice, and it was a most interesting sight, a group of these mountain men gathering about the ring-side intently watching the work of the judges. The Cheviot show was one of the best in many years, and it was no small task the judges had in making the awards, the competition was so keen. The sheep were not handled as much as in an English or American show. The Cheviot in fact, even though fitted for the show-ring, is a proud beast, and resents with much muscularity the repressing efforts of the attendants. The work of the judge is followed with much care, and the most respectful attention is given to his decisions. About the three sheep rings were to be found the greatest breeders of Scotland, men of strong character with a knowledge of sheep husbandary deep and abiding. These hill shepherds recognize that their land is fitted for sheep over all things else, and so, notwithstanding depression in business or reversals in political parties, they still have faith in their sheep.

COUNTY IMPROVEMENT WORK IN NORTHERN ILLINOIS

C. A. DAWSON, '15

IT was the writer's pleasure to spend a large part of the past summer in northern Illinois, more particularly in De Kalb County, which lies about sixty miles west of Chicago. Here King Corn may be seen in the height of his glory for the black, rolling prairie land of this region is not surpassed anywhere for the production of this great cereal crop. Oats come next in importance as a grain crop, while wheat and rye are grown to a considerably less extent. Alfalfa grows luxuriantly when properly managed and more farmers are coming to use it each year as they see the wonderful returns it brings and realize its value as a food and soil builder. Red clover is grown extensively, while soy-beans and rape are often seen on the better class of farms, showing that they are regarded as staple crops, having already passed through the experimental stage.

Early in the year 1912, the De Kalb County Soil Improvement Association was organized and incorporated with a capital of $10,000. Of this sum $2000 was subscribed by the board of supervisors, $2000 by the bankers of the county, and the remaining $6000 was raised among the farmers. It is especially significant that over one-third of the farmers were sufficiently interested in such a plan to lend their support in this. way

The man chosen to fill the important position of county agent and head of this organization was W. G. Eckhardt of the Department of Soils of the University of Illinois. Bringing with him the principles of soil fertility and permanent agriculture, so well tried and proven by Professor Hopkins, he was eminently fitted for this important position. He was at that time the best equipped and highest salaried county agent in the country. Seated at his desk in the association office in De Kalb, he was busy preparing some photographs for publication, but was glad to put down his work to discuss farm problems with a student of a neighboring state university, and to tell about the county demonstration work. The county farm, of which Mr. Eckhardt is superintendent, consists of one hundred and fifty acres. Its most noticeable feature is a thirty acre alfalfa field near the main road which this year yielded one hundred and fifty tons of excellent hay. The corn and oats, too, were far above the surrounding fields in appearance, showing what proper methods can accomplish. The farms which show the best results from the use of scientific methods are used as examples in teaching these principles to the other farmers. "The De Kalb County Farmer" is the name of the paper which is issued each month from the county office. It contains instructive articles on subjects of vital interest to the farmers of the county with an effective use of illustrations. Inoculation for legumes, soil practices, and the silo are topics that receive attention but nothing of general interest and profit is overlooked in getting up the paper. The subscription price is only ten cents a year in the county, but it is worth hundreds of dollars to any farmer who will give up the old methods of soil robbery and follow the new teaching.

Lectures are frequently given in churches, town halls and schools of the

county, lantern slides being used to make the talks more interesting and instructive. Co-operation is sought with the teachers, business men, and ministers at all times and this has been an important factor in the success of the association. Bulletins and also speakers from the experiment station are employed to aid in the work. The services of the county expert are free to all the farmers of the county and he frequently calls on several farmers in a day to help solve some special problem of soil management or of alfalfa culture or perhaps of hog cholera infection. In this way he can meet each farmer personally, discuss the problem at hand, and at the same time talk soil fertility in its various phases, as applied to his particular conditions.

Eighty bushels of corn is not too much to expect according to Mr. Eckhardt but without scientific methods many do not obtain one-half that yield. Four tons of alfalfa can be grown and the yield of oats greatly increased by following the teachings of the expert, which are, briefly: the use of lime, drainage, inoculation, seed-selection, treatment of oats for smut, proper crop rotation and application of fertilizers.

As to the general practice of farming in De Kalb County, most of the farms are a quarter section in size or smaller. From ten to thirty cows are milked on most of the farms and the milk is usually shipped to Chicago. Milking machines are used on some of the larger dairy farms and they seem to be growing in favor. Mr. Hog is very much in evidence and cattle are also fattened each winter. The use of silage for this purpose is increasing rapidly. Every farm has a silo with a very few exceptions, the monolithic concrete type of from one to two hundred tons capacity being most in favor. Hogging off corn is practiced, but most of this big crop is cut with binders and shocked or put in the silo. The labor problem is not as difficult as it is in many other farming communities, for the farmers are able to offer good wages so that many farm hands come out each spring from the east more especially West Virginia, to return home again in the fall.

There are so many points in common between Ohio agriculture and that of Illinois that a study of the latter cannot fail to be of interest to the Ohio student or farmer. In fact most of the principles and practices of our neighbors can be used with but little modification on the corn belt land of Ohio.

OF
OHIO STATE UNIVERSITY.
A MEDIUM FOR EXCHANGE OF IDEAS BETWEEN COLLEGE AND FARM

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COLUMBUS, OHIO, DECEMBER, 1914.

EDITORIAL

THE COUNTY EXPERIMENT FARM.

Of the sixteen counties voting on the establishment of the county experiment farm at the last election, only two, Mahoning and Trumbull, passed favorably on the proposition; and in these counties it passed by the margin of only a few votes. The fear of the high cost seems to be the only reason given for the universal rejection of this measure. County experiment farms have been in operation for some time in a number of Ohio counties and their efficiency as an educational institution among the farmers cannot be over-estimated. They have the feature which has evolved after years of experimenting and judgment of the best agricultural leaders of the day. They serve as a medium between the agricultural college or experiment station and the farmer. They occupy a position that no other institution can fill. This age demands that agricultural education be taken to the farmer and this can only be done universally through the county farm and the county agent. Conservatism on proposed taxation of the farmer is just but in this case it works a detriment; for the farmer should remember that he invests his money for his own direct benefit. However, this rejection is no sign that it will be forever defeated—it only suggests the necessity for advancing agricultural education and the conditions which must be overcome to do it. These counties will at some time realize their

mistake and then direct their attention more effectively to the matter.

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MIDWINTER FAIR.

For the first time since these shows have started the Ohio State Apple Show, the Ohio State Dairymen's Convention, the Poultry Show and the Ohio State Corn Show will be held together at the Ohio State Fair Grounds. Seven buildings will be occupied for the exhibition which lasts from January 9 to 15.

The buildings at the State Fair Grounds have been well suited to such an exhibition. Yet these shows have been held in all parts of the state, and consequently did not receive the commendation and recognition that was due them. Columbus, centrally located in the state, affords an opportunity to the farmer to take a short trip to see four shows representing as many lines of activity in the agriculture of the state.

Now that we are assured of this midwinter fair it behooves each one to do his best to make it a success. Boost each separate show and your efforts will go a long way to make the exhibition successful. Bring your friends to the Fair; spend the week reviving your spirit for dairying, grain, fruit and poultry; visit the university and the capitol and other points of interest in the vicinity; and you and Ohio farms will be benefitted.

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FOOT AND MOUTH DISEASE.

Foot and mouth disease has visited the United States now for the sixth time, each time entering the country apparently through a new channel. In 1908 the disease was carried through smallpox vaccine, while this year the infection is attributed to importations of hides to Niles, Michigan.

The infection this year is considered the most widespread that has ever been known in the United States. Infection early reached the Chicago yards and thence was carried through shipments of cattle to various parts of the country. While the fatality of the disease is low—only about 6% of the cases proving fatal—the disease causes untold hardships in other ways. The after effects often make the animals useless for a time. The greatest loss is due to the strict quarantine necessary in all states where the disease occurs. Farmers suffer severe losses because they cannot ship farm produce or livestock which they have ready for the market. The quarantine is now being lifted in many parts of the state, and as in former outbreaks it is expected that the disease will soon be stamped out, although the cost has always been high.

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THE RURAL MINISTER.

Religious problems are not the only activities in which the country minister should engage. He should also be a leader socially and there is no reason why he should not be a leader in an agricultural sense. Those people whom he cannot touch through religious work may be reached by some agricultural influence. At least many farmers form an opinion of the preacher from his knowledge in agricultural lines. For instance, a minister visiting at the home of one of his parishioners inquired how Angus cattle in the farm-yard lost their horns. Now this man was endeavoring to teach the farmers from a religious point of view, yet he was totally ignorant of the occupation and

practices of the farmer—a circumstance frequently found in the rural communities. This has led to much indifference on the part of the farmer while in part the fault lies with the minister. His education for the rural ministry requires more than a purely theological training. In view of this fact the general trend of education is being directed along this line. Many of the theological seminaries are giving courses in rural economics and other phases of agricultural activities. Special country life courses are offered by a number of the state universities during the summer months for the purpose of training the rural ministers for rural needs. When the minister learns how to co-operate with the farmer on rural problems, then he will have served his religion to a greater degree and will have narrowed the gap between himself and the farmer.

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CHRISTMAS AGAIN.

Christmas! The day of festivities and gladness and well wishing—the day chosen of God for the birth of the "Son of Heaven's eternal King"— the anniversary of man's redemption from sin. What heart is not thrilled in anticipation of this—the happiest season of the year? What soul is not awakened with Christian love at the approach of this festive day? For was it not on this day two thousand years ago that the angels announced the birth of the New King—God's Gift of Love and Sacrifice?

Today we show our appreciation by unselfish remembrances to our fellow men and by thanksgiving to our Redeemer. Old and young alike feel the impulse and exaltation of soul from this greatest of holidays. For weeks the small children dream of expected presents to be received on this day. The old folks' hearts are filled with joy as they see the old family circle once more united; the young folks are inspired with the enthusiasm of long vacation days and nights spent around the fireside where are recalled the golden opportunities of the present and the blissful visions of the future.

Then, with the plentiful store of the golden harvest before him, the farmer realizes how kind Nature has been mindful of him; and he rejoices in the plenty of the well-completed, but now passing year. The occasion offers him time for rest and meditation concerning the betterment of his fellowmen. How well does he understand the words, "Peace on Earth, Good Will to Men!"

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WAR AND THE FARMER.

What effect will the war in Europe have upon the American farmer? This question is now being asked many times. Any attempt to answer such a question must include many important considerations. However, there are a few things that seem almost certain. In view of the fact that foreign countries are taking a large supply of horses from this country which represent the poorer grades, and bearing in mind that Belgium and France, two of the greatest horse-breeding centers of Euroue, are being destroyed, it seems that the horse breeders of this country can look forward to an improvement of their conditions.

No one is able to say how long the present struggle will continue, but if the next harvest of American wheat is required to supply the need of the warring nations, the farmers will find a ready sale for their grain. These are but two questions that have been developed from present European conditions.

The boys' corn growing contest is over and Arnett Rose, of Allen Co., is champion of Ohio. Arnett who is 17 years old has made the record of 153 bushels on one acre. His total expenses including rents, labor, fertilizer, etc., were $36.70. On the day of husking, according to market value, the net profit was $60.22. The net profit of the average Ohio farmer is $7.22. If the farmers of Ohio, with their annual 4,000,000 acres would produce the same as Arnett, what would be their increase in profits to the state? $212,000,000. Is it worth thinking about?

What is Christmas to a child without a Santa Claus? Do gifts from the parents to the small child have the same value as those placed on a tree or in a stocking? Should we forget the tradition of him who has carried toys to the chimney tops for so long a time?

A properly planned Christmas entertainment is always fitting to any school before the Holidays begin. Many children have no other opportunity to appear before an audience. Every person of note has made his distinction by having an opportunity to show his ability when he was too young to realize its value. The teacher may open many of these doors to opportunity. How fond parents thrill as they see their children in the school entertainment! Every father wishes to see his own son develop into a man greater than himself.

Programs vary from year to year and from school to school, but they should all tend to cultivate that enthusiasm natural to youth. The tradition may seem common-place to the old folks but it is life anew when the younger ones are seen to enjoy it.

The Buckeye Corn Special started for Washington November 30. After a season of tedious toil the champion corn growers of Ohio receive their reward. The throng, fifteen hundred strong, including the old and young of Ohio's most progressive citizens will spend a one week sight seeing tour in Washington, Philadelphia and New York. The seven Pennsylvania Railway trains which carry the party through the east will be in charge of T. P. Riddle of Lima, Ohio.

More sight seeing will be afforded this party and more honors will be accorded them than they will possibly dream of. Verily they have their reward. May the defeated champions of this year profit by their past experience as they plan for the next contest.

As a reward for their success in raising good crops, California boys receive a trip to the East. During the last month a group of twenty-five of these high school boys made a tour to the Atlantic coast at the expense of their state. Many points of interest are visited and the trip is of untold educational value.

AGRICULTURE IN THE RURAL SCHOOLS.

In introducing this article the question might be mentioned, "Why devote so much attention to the study of agriculture in the rural school?" This question has no doubt occurred to the minds of many people in the rural districts as well as in the city. It seems very fitting that the consuming man of the city should be brought to a broader knowledge of the producer on the farm. This proves profitable to both. However, when we talk of educating the farmer's sons and daughters in the schools in work of the farm and home, some are too short sighted. They think that since they had no special agricultural training in the schools, their children can also succeed without it. Fortunately the parents can seldom hinder an interested child. We believe, however, that most parents in the country desire an efficient education for their children; and this is mentioned to show some of the difficulties that experience has brought forth.

The presentation of agriculture in the rural school has its peculiar difficulties and different ones will be met with in different localities. The writer feels that Harrison County rural schools present difficulties and opportunities that may be duplicated in many other parts of the state. A very common difficulty is the changing of teachers so frequently. Due to lack of systematic education, one teacher probably would know little or nothing of the methods and progress of the former teacher. The writer has observed the difficulties facing the pupil when methods were radically changed from one year to the next.

The question often arises as to when we should begin the teaching of agriculture to a pupil. The writer believes strongly in the value of story-telling, also the fact that a child's agricultural training should begin early. A well chosen story may teach a fine point in agriculture and hold the attention of the primary pupil as nothing else could do. We have found this very true in the higher grades as well. One reason we advance for beginning early is that if the proper impression is made and an interest created in the first years of school it will be lasting in its hold upon the individual. The old saying that "As the twig is bent, so is the tree inclined" is especially applicable in this case.

While some work by the pupil's own hands can be easily secured in primary grades the really intensive applications of theory begins in the intermediate department. Here we take up the definite study of some of the different branches of agriculture. The interest of the pupil is secured in class if the teacher will perform some simple experiments illustrating points in the lesson at hand. Some of the easier experiments may be performed by the pupils themselves. We have secured excellent results by assigning an illustrative experiment to pupils a day or two in advance of the recitation and allowing them to collect and arrange all the material for it with their own hands. We have found that the pupil likes to do things and if that can be cultivated we need have little fear concerning the future success of his or her career. We find that this is a good time to give the pupil credit for practical home work. The boy will enjoy his chores morning and evening if the co-operation of the parents can be secured and if he knows that someone takes note of and credits him for his work. It tends to insure promptness, willingness

and thoroughness in him. The girl may have her duties assigned in the home and receive the same benefits as did her brother in his work. If we can do this effectually there will be fewer and fewer boys and girls from the rural districts seeking work in the cities and complaining of the drudgery and monotony of the farm.

In the advanced grades the teacher will be required to be more and more widely read in science and agriculture. At first sight it seems rather strange that the sciences enter so much into agriculture, but each year finds them more firmly incorporated in that work. The laboratory and home work at this stage becomes very important because of its wide range. The school mentioned was handicapped by lack of apparatus for school demonstration, but by using some furnished by the teacher some interesting experiments were performed. The pupils responded readily and the teacher felt well repaid for the time and work which attended the experiments. A Babcock milk testing outfit was used in the class work and several samples of milk brought by pupils and others were tested for butter fat. Along with this was given work in dairy herd record keeping which created some interest among the pupils. Corn testing may be conducted very profitably in the spring and helps the farmer as well as the pupil in the school. Some time was devoted to grafting, in which each member of the advanced class was requested to prepare samples illustrating the proper manner of grafting by different methods. Although the girls are interested in some of the above work, it is well to give attention to more advanced work in the home; as preparation of meals, general care of the home and home management. The teacher must be on his guard even when presenting the above work to keep up the interest in the subject at hand, because a disinterested student of agriculture will never get very far along in his work.

We have found that a great number of pupils become deeply interested in nature study if properly guided in that subject by the teacher. By personal observation it has been learned that such diversion lends spice to the work and tends to better scholarship generally. A vast amount of space might be taken to tell of the needs of the country school to properly care for its youth and of the great possibilities awaiting for the live teacher, but this is intended only to show how much agriculture has been presented by the writer in one or two of the rural schools in eastern Ohio. While there may be nothing very notable in the work it is given because it did a little, we trust, to keep the boy and girl of today for the life of the modern farm and its home.

K. D. Price, '18.

BILLY AND MOLLY.

Billy was an ordinary country boy, interested in horses, hogs and crops, but more especially in Molly—his own Jersey cow. Billy's father was a farmer and dairyman of the old school. His twenty cows milked splendidly during the summer while pastures were luxuriant. However, when the cold winds of winter came the milk flow went down with the thermometer until by spring they were not paying for their feed. Old Molly despite Billy's anxiety and attention, would drop in milk flow with the rest of the herd.

Billy was counted a dull boy in the high school where his parents were sending him. He was not doing much better there than was old Molly at the milk pail in the cold zero weather.

One evening Billy had to stay and do some work after the other students had gone home. While sitting at the reading table his eyes chanced to wander over a bulletin skillfully placed there by a wise teacher—telling why so many cows dropped off in their milk flow during the winter. Billy read. It described his father's system to a T. But best of all he found out how to get as much milk during the zero weather of winter as in the summer time. After reading about oil meal, cotton seed meal, bran, protein, clover, alfalfa and balanced rations, Billy started home to practice on Molly. Now he had to buy all Molly's feed at market prices but he sold his milk at a goodly sum to select trade.

To make a long story short, Old Molly so far surpassed the rest of the cows in the herd that the next winter Billy took half the herd under his own care and managed it so successfully that his father sent him to the state agricultural college.

There are hundreds of Billys in our eighth grades and rural high schools who are often helped as much by tips talking with some one as they are by their regular regular hewed-to-the-line school work.

It is so easy to have a modern, well organized, and "up-to-the-minute" library that its lack is not excusable in any school. The teacher can readily get all the latest scientific and popular reading material from the most careful investigators and collections if he only knows where to go. The state agricultural college, experiment stations and extension departments have specially prepared bulletins and reading matter of different sorts on all kinds of subjects. The United States Department of Agriculture is always ready to supply their material to any school in the land. Moreover, many of the farm papers will send a copy of their publication to the library free or at least for a very nominal sum. Then many of the great industries are sending out the very best and latest information collected from all sources and condensed in the most concise forms.

At present many agricultural books are being furnished which may be obtained very cheaply and frequently at a considerable discount from the published price. After these books, bulletins, papers, etc., are obtained, they should be numbered and filed and clearly indexed so they will be easily understood and readily available. Group the books by subjects and keep a list of them. Allow the children to take them home for a limited time. Keep the bulletins and farm papers where they are accessible. If they wear out by hard usage so much the better, get another set. Books, magazines, papers, and bulletins were written and printed to be read. Read them. Induce the children to read them and more Billys will become interested in feeding more Mollies or perhaps growing bigger and better crops of corn, oats and apples, so the per capita output of our vast American farms will be increased and old "High Cost of Living" will receive another jolt.

J. W. HENCEROTH, '14.

Yule's come and Yule's gane,
And we have feasted well;
Sae Jack maun to his flail again,
And Jenny to her wheel.

BIRDS FROM THE VIEWPOINT OF A CONSERVATIONIST

H. A. GOSSARD, Ohio Experiment Station

AS a class, birds have probably passed their climax in size, numbers, and importance in the world's economy. They now appear to be vanishing, though still a numerous remnant of a mighty host that has played a unique and very consequental part in the world's unfolding. The last chapter has already been written in the history of many species, and the present generation of men will not pass without seeing the end of a number more. In the geological periods preceding the present, many of the birds were very large and some of them wingless, or provided with quite rudimentary or atrophied wings like the ostrich. These species were naturally marked for early destruction and, when man first appeared on the earth, there were but few birds living larger than the ostrich, which today remains as our largest species.

Like these birds of the far away past, in our own times has vanished the Dodo, the Great Auk, the Passenger Pigeon, and a number of others; and the Wild Turkey, the Prairie Hen, the Wood Duck. the Woodcock, the Snowy Egret, and several other species are fast going, so that within the life-times of children and men now living, some of them are almost certain to have joined the dust of their last representatives with that of the fated thousands of species gone before.

Man, himself, is the chief cause of their decline, and it, therefore, behooves us to inquire what are the real functions of birds in the world's economy and what mankind can do, if desirable, to multiply the numbers and prolong the existence of such species as are useful.

Let us consider the exact food habits of some of the common species and groups, as determined by careful analyses of the stomach contents made by scientific investigators.

The Bluebird eats cutworms, canker-worms, hairy caterpillars, grasshoppers and some fruit, chiefly wild berries. In August and September, over 50% of the food is grasshoppers, and altogether 75% of the food for the year consists of insects, most of them harmful. The food of the Robin consists of 42% animal matter, chiefly insects, the remainder being made up of small fruits and berries. Of the 58% vegetable food, 47% consists of wild varieties of fruit. In June and July, cultivated fruit rises to 25%. In August, grasshoppers constitute over 30%.

The food of all the thrushes is similar, and that of the Wood Thrush may be taken as representative for the others—among which may be named Wilson's Thrush, Hermit Thrush, Alice's Thrush, Louiana Water Thrush, and Mockingbird. During the summer over 70% of the food of the Wood Thrush is insects. Grasshoppers, crickets, ground beetles, click beetles, wireworms, cutworms, ants, caterpillars, both smooth and hairy, canker worms, rose beetles, snails, slugs, spiders and the thousand-legged worms or millipedes are the forms most commonly taken. Some fruit, mostly wild berries, is also eaten. Aside from their food habits, these birds are worthy of preservation because of their exquisite singing, the Mockingbird contesting with the European Nightingale for the first place among songsters.

The White-breasted Nuthatch, the greatest of bird acrobats, consumes

weed seed and insects; click beetles, boring beetles, ants, scale insects and their eggs, eggs of the canker worm moth, gypsy caterpillars, plant lice and small bugs are eaten

The food of the wrens consists almost wholly of insects. The Carolina Wren eats small caterpillars, worms, borers, insects's eggs, and larvae found in the crevices of bark. The food of the House Wren is 98% animal matter of which one-half is grasshoppers and beetles; the remainder mostly caterpillars, bugs and spiders. It is a specially valuable tenant of the garden. The food of Bewick's Wren is largely of insects, taken in or near the ground. The Long-Billed Marsh Wren consumes insects, spiders and snails, taken from the marshes. Beetles, bugs, leaf-hoppers, flies, hymenopterous parasites and ants are among the insects taken.

About the first week in May, the Warblers, represented by more than a score of species, pass through Ohio to their summer homes in Canada, or some come to nest and abide with us till the approach of another winter sends them again to the southward, often to the West Indies, Mexico, or South America. In passing, they often clear badly infested orchards of plant lice and devour other small insects. Among the larger insects, young cankerworms, ants, moths, curculios, young grasshoppers, various flies, various measuring worms, case-bearing caterpillars, leaf-hoppers, and dragon flies are taken. Some small seed are also eaten.

The Great Northern Shrike destroys some beneficial birds and many mice and insects. Beneficial birds form less than 25% of the total food. Mice make up 25% and grasshoppers 25%. In their Canadian nesting grounds, the young are fed largely with grasshoppers.

The Swallows feed largely on winged insects, most of these being captured by the birds in flight. The Purple Martin takes rose beetles, May beetles, horse flies, flying ants, and many others. The Barn Swallow depends almost wholly upon insects. Codling moths, cankerworm moths, leaf-roller-moths, horse flies, horn flies, mosquitoes, gnats, and crane flies are all very commonly taken. The Tree Swallow feeds upon flies, mosquitoes, garden insects, leaf-eating beetles, rose beetles, winged ants and other insects, taken on the wing; also on bay berries, sumac berries and other wild fruits.

The beautiful little Goldfinch, during the nesting season, subsists largely upon insects of various kinds,—plant lice, flies and the smaller grasshoppers, but at other times chiefly upon seeds. They eat seeds of sunflower, lettuce, turnips and other garden plants, and are especially partial to the seeds of the thistle; seeds of hundreds of other weeds and grasses are eaten.

The English, or House Sparrow, can hardly be included among its relatives as a beneficial bird. It drives from their nesting places nearly all of our valuable native insectivorous birds and molests them at every opportunity. About 50% to 60% of the food of the nestling consists of insects, the remainder of grain and fruit. The adults destroy great numbers of fruit buds and blossoms for food or pleasure, and 90% or more of their total food consists of grain, weed seeds and fruit. This species has adapted itself to the conditions of civilization, and is able to take care of itself and replenish its numbers in spite of all the warfare that man is able to wage against it.

The two Orioles, the Orchard and the Baltimore, are pre-eminently birds of the woodland and orchard. The former

eats click beetles, tent caterpillars, and nearly all the common insects of the orchard, in large numbers. The last named eats some cultivated fruit, but prefers June berries, mulberries and other wild sorts, if obtainable. Over 80 % of its food consists of insects, caterpillars comprising 34% of the whole. The tussock, gypsy, brown-tail, tent and forest caterpillars, the fall webworm, and the spiny caterpillars of the mourning cloak butterfly are all taken. Click beetles, weevils, May beetles, cucumber beetles, bag-worms, curculios, wasps, bugs, plant lice, scale insects, crane flies and sawflies are also among the forms taken.

The food of the Meadow Lark consists of both insects and seeds. Grasshoppers make up 29% of its food for the year, and comprise 69% of it in August. About 21% consists of beetles, two-thirds of which are harmful. Caterpillars, cutworms, ants, chinch bugs, wasps, etc., bring the total percentage of insect food for the year up to 73. One-half of the vegetable matter taken is grain and the other half weed seed.

The Bobolink, or Skunk Black-bird, conducts itself in an unexceptionable awy, while with us in the summer, but is known as the "Rice Bird" in the Southern States and is justly execrated in that section for the waste it causes during the months of its winter sojourn. Its summer diet, in the north, is 85% insect food. Grasshoppers, caterpillars, army worms, and insects of the meadow and field are taken.

The Crow eats much grain, some insects and occasionally, or perhaps quite often, the eggs and young of other birds. It eats many grasshoppers, white grubs, cutworms, etc., and some mice, but it is a bird of very doubtful value.

The Blue Jay eats many nuts, acorns, chestnuts, pecans, and similar sorts having rather thin shells. Some grain and fruit is eaten in summer. Insects, mainly beetles, grasshoppers, and caterpillars are taken in summer. Some Jays have the habit of killing and eating the young of other birds, also their eggs. Mice, shrews, and frogs are sometimes eaten. A limited number of Jays are probably not objectionable, but evidently the character of this loud and saucy bird is open to serious questioning.

The food of the Flycatchers, Kingbird, Phoebe, Chimney Swift, Nighthawk, Whippoorwill and Ruby-throated Hummingbird is largely made up of insects taken in flight, including house flies, horn flies, horse flies, gnats, mosquitoes, flying ants, cutworm moths, and miscellaneous beetles, wasps, etc., some of them nocturnal, others day fliers.

The Woodpeckers efficiently perform an office for the woodland and orchard that is but imperfectly performed by parasites under any circumstances and, generally, not performed at all. The various bark and heart borers of wood, so destructive to trees, and so well out of reach of parasites and of poisonous or contact sprays, form the accessible and constant diet of the woodpeckers. Perhaps the simplest explanation of the fact that birdless countries are also treeless countries, is that the woodpeckers are absent.

While the Great Horned Owl is a murderous species, living to a great extent upon birds more valuable than itself, and deserves no protection, it is practically extinct in Ohio, and all the other owls are, in the main, beneficial. The Barn Owl is among the most useful. Meadow mice and other forms, including house mice, shrews, rats of various kinds, moles, bats and birds

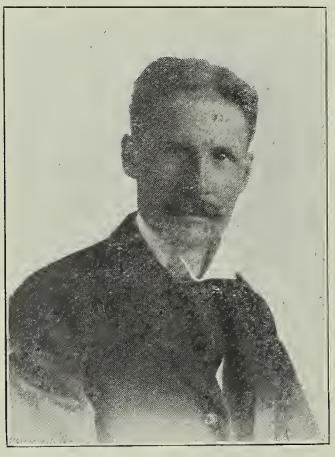
make up the food. English sparrows are taken more numerously than other birds.

Over 60% of the food of the Bob-white is weed seed; ragweed, pigweed, sheep sorrel, paspalum, jewell weed, pigeon grass, etc., furnish the food. The stomach of one bird contained 200 seeds of ragweed, a third 620 seeds of pigeon grass, and a fourth 550 seeds of sheep sorrel. Grasshoppers, chinch bugs, Colorado potato beetles, striped cucumber beetles, May beetles, army worms, cutworms, etc., are also freely eaten.

The Woodcock, the Sandpipers, Sanderling, Yellow-legs, Snipes, Rails and Plovers all feed to a great extent upon angle worms, crustaceans, and aquatic and upland insects, according to their habits of spending their time either near the water or away from it. A year or two ago I had occasion to examine a rye field, about 50% of which has been destroyed by white grubs. The ground was dotted over with little holes made by birds in collecting the grubs. A flock of killdeers were the only birds visible in the field and seemed to be busily at work collecting these fat, juicy worms. Next morning, two of the birds were shot and their stomachs examined by Messrs. Houser and Goodwin, of the Experiment Station, who found 17 grubs in the crop of one of the birds and 19 in that of the other.

I have gone thus into detail regarding the exact food habits of so large a number of our common birds, because I am satisfied that the concrete figures I have given regarding their stomach contents, are far more impressive than any general statements I could make regarding the value of birds as a class. No one can consider the evidence afforded by these data without concluding that birds are a great factor in keeping the earth fit for human habitation. It has been conjectured by a careful student of the question that, if birds were swept from the earth, all higher forms of vegetable and animal life would be impossible after eight years. Entomologists, in general, suspect that this bird student over-guessed the mark, for the ornithologist is very apt to almost ignore the work of predaceous insects, or insect parasites, and of entomogenous diseases which are well known to entomologists to be far more numerous, omnipresent, and effectual in keeping the equilibrium of insect life than all other agencies combined. However, as I have already pointed out, some insects are almost beyond the reach of parasites and also of poisonous or contact sprays, yet are readily captured and eaten by certain birds, and the good offices of the rapacious birds in limiting the numbers of rodents is beyond controversy. Nothing but disaster can logically be expected from any great and sudden reduction in the numbers of feathered friends, and even the gradual, though rather rapid decline which is going on from year to year, is being imperfectly compensated by insect parasites, predaceous insects, fungus and bacterial diseases, and similar agencies. These latter agents lack the mobility of birds and cannot so quickly disperse themselves over wide expanses of country in time of emergency. It appears that to maintain a perfect balance in the insect world, we must have both classes of friends, and that any rash tampering with the balance, which has become more or less established through a long succession of geological ages, must be fraught with grave menace to the welfare of mankind.

William P. Bently, '85, now Professor of Church History at Berkeley Seminary, Berkeley, California, was the first graduate of the agricultural department of Ohio State University, known at that time as The Agricultural and Mechanical College. After graduating from Ohio State he spent



two years in the completion of a classical course at Bethany College, Bethany, West Virginia, and then assumed the management of a fruit plantation in southern Kentucky.

In 1890 he proceeded to China under the auspices of a National Church Board to establish a school for boys in Shanghai. While engaged in this work he was commissioned by the Viceroy of Nankin to establish in his viceroyalty, an agricultural college. The general plans were drawn up, the courses of study marked out and the site chosen when the Boxer war broke out. At this time the progressive Viceroy died and the whole scheme was abandoned. However, marked benefits resulted, for a book, "Outlines of a National Department of Agriculture," prepared in the Chinese language by Prof. Bentley, was made the basis of the subsequent steps taken in modern scientific agriculture in China by the Chinese government. For this work he received the official thanks of the Chinese ruler.

Another book, "Lives of American Presidents and Selections from their Writings," has become a standard work of reference and its influence during the years that preceded the establishment of the Republic.

"In those early days of the Agricultural Department," says Prof. Bentley, "no one dreamed of the amazing extent of modern specialization, but we had the close touch of its first great leader, Dr. Townshend, and this was no small compensation. Moreover, we may well remind ourselves that it was the ideals and devotion of Dr. Townshend which made possible the technical perfection and efficiency of present-day agricultural education."

Clifford H. Hatfield was graduated from Ohio State in 1904, and then spent two years as Student Secretary of Ohio State University Young Men's Christian Association. In June, 1906, he became State County Work Secretary with the Ohio State Committee of Young Men's Christian Associations, and continued in this capacity until February, 1912, when he became County Work Secretary of the International

Committee for the Western Field, having the territory from Ohio to Colorado. His work is largely field work, co-operating in the organization of State County Work Committees and assisting them in the establishment of the rural work in their respective states. He also gives advisory counsel and field co-operation to the states which are doing County Work, which in this territory are as follows: Ohio, 6 organized counties; Michigan, 15; Wisconsin, 6; Kansas, 5; Iowa, 6; Colorado, 2.

Byron Pontius, '14, has accepted a position as head of the animal husbandry department in an agricultural college at Alfred, N. Y. He will have several assistants to take care of the dairy department which is under his supervision.

W. R. Beattie received his master's degree in 1897 and was later connected with the Department of Botany at Ohio State. In September, 1899, he accepted a position with the U. S. Department of Agriculture at Washington, D. C., which he held until June, 1912. At this time he accepted his present position as Agricultural and Industrial Commissioner of the St. Louis Southwestern Railway Lines. His work in this department is along agricultural extension lines.

J. E. Robinson, two-year course, '14, is farming near Felicity, Clermont County, Ohio.

H. H. Sorrick, '14, two-year course, is farming the home place near Lake, Ohio.

R. L. Shields, '06, head of the animal husbandry and dairy department of Clemson Agricultural College at Clemson, S. C., is carrying out some feeding experiments relative to the uses of cottonseed meal and cotton products in relation to the agricultural conditions of the South. So keenly is the cotton situation felt that this was deemed very necessary.

George L. Story, '10, was employed for one year after graduation in the Extension Service of Ohio State University and since that time has been serving in like capacity at Massachusetts Agricultural College. His work at that place is confined to animal husbandry and dairy subjects.

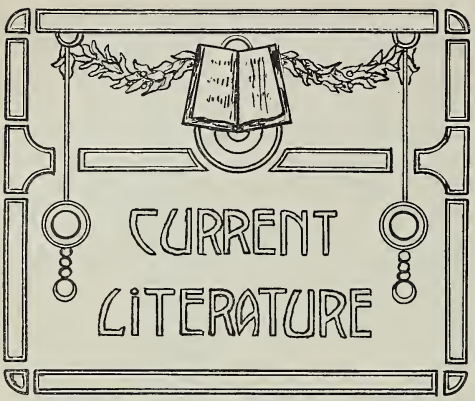
M. D. Helser, '14, is teaching in the Department of Animal Husbandry, Arkansas State Agricultural College, Jonesboro, Ark. He was married in August to Miss Elizabeth Stevens of Linnville, Ohio.

H. R. Watts, '10, a former Editor of The Student, is now connected with the Agricultural Experiment Station of the University of Tennessee at Knoxville, having gone there from Wellington, Kansas.

B. A. Schnell, '12, is secretary of the Y. M. C. A. Associations of Union County. He recently moved from Medina to Marysville, Ohio.

O. P. Dill, '12, has removed from Columbus, Wisconsin, and is now teaching agriculture at Storm Lake, Iowa.

E. W. Foster, two-year course, '12, is farming near Thornville, O.



"Dairy Cattle and Milk Production" by Prof. C. H. Eckles of the University of Missouri. In this book the origin of domesticated cattle; the selected dairy type; the origin, adaptation and records of each dairy breed; selection and care of the herd are fully discussed. Feeding for milk production and the construction of dairy barns complete a book that should be of untold value to any student of dairy cattle. 342 pages, illustrated. Net, $1.60. The Macmillan Co., New York.

"Farmers' Manual of Law" by H. E. Willis, LL. M., of the University of Minnesota, College of Law, is a text book adapted to the use of the farmer and the student in the agricultural college. Every farmer should have a law book adapted to his special needs. Those branches of the law which he is most likely to need are given greatest attention, the individual farmer being considered in each case. 405 pages. Cloth, $2.00. Orange Judd Co., New York.

"Farm Manures" by Chas. E. Thorne, Director of the Ohio Experiment Station, is the most complete compilation of the results of experiment stations along the lines of green and farm manures. The origin of the soil, elements of plant growth, and commercial fertilizers are also discussed. Such a book coming from this soil fertility expert should be in every farmer's library. 242 pages, illustrated. Cloth, $1.50. Orange Judd Co., New York.

"Clean Milk Production" by S. D. Belcher, M. D. In this book the author sets forth practical methods for the exclusion of bacteria from milk, and the sanitary conditions to be carried out in the production of clean milk from the stable to the consumer. 146 pages, well illustrated. Cloth, $1. Orange Judd Co., New York.

"Agriculture for Beginners" by C. W. Burkett, Editor of American Agriculturist, F. L. Stevens, Professor of Plant Pathology at Illinois, and D. H. Hill, President of North Carolina College of Agriculture, is the most widely used text book in our grammar schools today. This is because it is written by teachers who know how to present farming fundamentals in such a way as to be most interesting to young pupils. 355 pages, illustrated. Cloth, 80c. Ginn & Co., Boston, Mass.

"The Cereals in America" by Thos. F. Hunt. This is a comprehensive treaties on the cultivation and improvement of every grain crop raised in America. First hand knowledge has been the policy of the author in this work and every crop treated is presented in the light of individual study of the plant. Concise statements of experimental results and of farm methods in relation to the cereals make it a work equally valuable to the farmer and student. Illustrated, 450 pages. Cloth, $1.75. Orange Judd Co., New York.

"Principles of Rural Economics" by T. N. Carver, LL. D., and D. A. Wells, of Harvard University, is a new book setting forth the economics of agriculture in a different light. Its viewpoint is that of the national betterment of rural conditions rather than individual improvement. The farmer is taught the importance of his profession to national prosperity, rather than accumulation of wealth by better crops. 386 pages. Cloth, $1.30. Ginn & Co., Boston, Mass.

"Manual of Fruit Insects" by M. V. Slingerland and C. R. Crosby, is one of the Rural Manuals edited by L. H. Bailey. It handles the subject of insect pest in a practical manner for the commercial grower. No insect attacking our fruit trees is so small that its life history is not described, its injuries explained, and the means of combating it given in detail. A chapter dealing with insecticides complete a book of economic importance to all fruit growers. 503 pages, with more than 400 illustrations. Cloth, net $2.00. The Macmillan Co., New York.

"How to Choose a Farm" by T. F. Hunt, Dean of the College of Agriculture of the University of California, is a book whose worth is always appreciated by those seeking land, knowledge of farm values, and the possibilities in agriculture in different localities. Nothing has been left unsaid which can aid the prospective buyer in selection of a farm of his ideals. 412 pages. Cloth, net $1.75. The Macmillan Co., New York.

"The Principles of Live Stock Judging" by C. W. Gay, D. V. M., B. S. A., is a new book added to The Rural Text Book Series and like the rest of the series it deals with the subjects and problems of most progressive agricultural of today. With chapters devoted to the relation of anatomy and function and procedure and practice of judging, we pass directly to separate chapters dealing with horses, cattle, sheep, swine, and breeding animals. Each coming from a man of life long experience and a professor of Animal Industry, is handled in a practical and exhaustive manner and the possibilities of the book are unlimited. Numerous illustrations of the best live stock in the world aid further in relieving the monotony of printed pages. 413 pages. Cloth, $1.50. The Macmillan Co., New York.

"Experimental Dairy Bacteriology" by H. L. Russell and E. G. Hastings. The first part of this work is an outlined course, the purpose of which is to train the student in those bacteriological processes that are necessary for him to comprehend thoroughly, before he is in a position to appreciate the relation of micro-organisms to dairy processes. A concise and comprehensive treaties then follows on the relation of these organisms to these various dairy processes. Illustrated. 147 pages. Price, $1.50. Ginn & Co., Moston, Mass.

"The Rural Church Movement" by Edwin L. Earp. The purpose of the author in writing this work has been to select outstanding facts and methods and apply them to the conditions in rural life the church is now facing, showing those to be adapted to new plans, and those because no longer useful, to be discarded. The various chapters are written in a form usable as a text as well as a volume for the general reader. 176 pages. Price, $0.75. Association Press, New York.

While at the Agricultural College and Experiment Station Workers' convention at Washington, November 9-14, Pres. W. O. Thompson was received by President Woodrow Wilson. Much credit is due Pres. Thompson for the passage of the Smith-Lever Bill and for its satisfactory adjudgment in reference to its use in the individual states. His influence and direction of committees brought about the co-operation of the U. S. Department of Agriculture and the Agricultural College and Experiment Station of the state in which the national extension funds will be distributed. For instance, in Ohio, the U. S. Department of Agriculture will not attempt to place the extension funds, but instead will depend upon the wisdom of the authorities of the agricultural college for its best use. Furthermore, no other activities pertaining to agriculture will be carried out without the sanction of the agricultural college and experiment station.

Fred Seiple, a butcher in the North Market house, gave a practical demonstration in meat carving and uses of different market cuts for cooking purposes before a crowd of 250 in the Judging Pavilion on the evening of November 17. A raffle for five pounds of meat from the best cut was won by R. L. Schmitt, a senior in the agricultural college. This demonstration was the monthly feature of The Saddle and Sirloin Club.

Dr. W. C. Thompson, Dean H. C. Price, Prof. Geo. Livingston, C. S. Wheeler, and G. M. Falconer were among the Ohio men who attended the national convention of Agricultural College and Experiment Station Workers at Washington, D. C., November 9-14. Pres. W. O. Thompson and Director Chas. E. Thorne delivered several addresses at the convention.

Appropriations which were held back because of the building of the new English Building are becoming available and are being used in the construction of greenhouses at the rear of the Horticultural Building. One section, 30x 100 feet, is now in the process of erection and will be followed by two vegetable houses both 45x250 feet, forming a three-roofed effect. When completed 8,000 square feet will be under glass. The entire greenhouse will be divided into a number of special compartments including a palm house, a head house, a vegetable house and students' laboratory.

Additional features in the way of excellent lighting and facilities have

just been completed in the Horticultural Building. The lights are of the approved Mazda type and the heating and ventilating apparatus is the latest on the market. Air which has been vaporized to the correct humidity and heated to the proper temperature is made to circulate to all parts of the building. During the warm months of the year it is possible to lower the temperature about five degrees below that of the outside atmospher by means of the ventilating system.

Using walking chilled, walking steel, sulky, frameless and gang plows furnished by the department of agronomy, R. E. Crouch and F. S. Searle are working out a thesis in agronomy on the relative draft of each of the plows mentioned above. A recording dynometer shows the amount of draft and determines the efficiency of attachments and hitches in each case. Five acres on the river farm have been set aside for the work, most of which is timothy sod. The stubble ground will be used for a similar purpose in the early spring months. Moisture content is also considered in its relation to draft. Copies of the result of this experiment have been requested by agricultural colleges of Utah, Missouri, and Nebraska.

Agricultural Extension Schools began at Howard in Knox county and Alexandria in Licking county on November 15. Unusual interest was shown in the schools and the attendance was much better than expected. Owing to the foot and mouth disease much of the live stock deomnstration work in the schools will be discontinued.

"It is probable that the horse-producing section of Belgium is entirely destroyed, for it is in the cetner of the German and allied armies," said Prof. C. S. Plumb in addressing the members of the University Grange on Wednesday evening, November 18. "The stallions in Gelgium are all trained to work and those not used in the army have probably been taken by the Germans; so the horsefen must look elsewhere for breeding stock."

Lantern views of many of the agricultural institutions as well as scenes on the farm, orchards, and commercial nurseries of Belgium were shown.

Belgium was considered one of the best agricultural countries before the present war broke otu, although she has only about one-third the area of Ohio and three times the population. Dogs are used for draft purposes and are an important factor in the life of the country people. A national society for the breeding of draft dogs is maintained by the government.

From fifteen to twenty samples of soils coming from all parts of Ohio each week are tested and sometimes analyzed by the department of agricultural chemistry. Acidity tests are applied to each sample and where the sender remits the necessary funds quantitative analyses of nitrogen, phosphorus and potassium are made. However, advice is given mainly from the physical properties of the soil. Questions regarding topography, crops grown, drainage, rotations, the growth of clover and other factors are answered by the person sending the sample; then from this the needs of the soil and the adaptability of crops can be given. So practical has this become that the number of samples and inquiries of soils increases greatly each season.

The faculty of the veterinary college

is in favor of raising the requirements for entrance in that college to 15 units as now required in other colleges in the University. Heretofore only eight hours have been necessary for entrance. A combined agricultural-veterinary course has also been planned. The first three years will be spent in the college of agriculture and the last three in the college of veterinary medicine. Degrees will be given from both colleges.

Trained men for building up and properly managin gdairy herds are in demand both by those who have the mean sof building an up-to-date dairy farm and by the state for supervisors of Advanced Register work. The college of agriculture is recognizing the needs of the people and endeavors to supply their wants. A four-weeks dairy course prepared for training men for the work mentioned above will be given from January 4 to 30.

Another course that will prepare men in the art of making high grade butter, cheese and ice cream will be given from February 1 to 27.

Thirty students interested in agricultural engineering held a meeting recently to organize a student branch of the American Society of Agricultural Engineers. Prof. H. C. Ramsower and Prof. I. W. Ives spoke in behalf of the movement. Petitions will be presented to the faculty of the agricultural college and to the National Society of Agricultural Enginers asking permission to form a permanent organization at Ohio State.

Plans and preparations have already been started for the annual grain show which will be held February 1 to 5 in Townshend Hall. Stanley Sink has been elected president and H. U. Simmermacher, secretary of the Agronomy organization, which has charge of the show.

A number of valuable premiums have already been secured for the contest. Competition will be open to students of the agricultural college, me nattending Farmers' Week and the Ohio Corn Boys. Theie will be an exhibit from the Ohio Experiment Station, students' judging contests and talks on grain culture at the show this year.

As a precautionary measure against infection by foot and mouth disease the cattle barns and hog premises on the university have been quarantined, visitors and students being prohibited to pas sthrough them. While no symptoms of the foot and mouth disease has appeared it was deemed advisable to take teps in preventing the entire destruction of the university live stock.

Three bulletins, "Syrphidae of Ohio," by C. L. Metcalf; "Ohio Vascular Plants," by John L. Schaffner, and "Botanical Survey of Sugar Grove," by R. L. Griggs, have already been published from the work of The Ohio Viological Survey. Two others, "Lichens of Ohio," by Prof. Fink of Miami University, and "Slime Molds," by Prof. Fullmer, of Baldwin-Wallace and Prof. Grover, of Oberlin College, are nearing completion and will be ready for distribution in the near future.

"Syrphidae of Ohio" is an economic study of flies, giving their predacious habits on the plant lice and their usefulness in reducing the damage by those insects.

"Ohio Vascular Plants" is based upon the present collection of Porf. W. A. Kellerman and other botanists and dontains up-to-date knowledge of state

florae, giving their distribution by counties.

"Botanical Survey of Sugar Grove" represents a careful study of the plants of a peculiar locality, Sugar Grove, a spot of broken country which has retained its origina lplant conditions more perfectly than any other spot in the state. Present cutting of the forest in that locality, however, is fast destroying the original conditions which serve to preserve the primitive vegetation.

The Ohio Biological Survey has been inaugurated as the result of a plan of co-operation between a number of the different colleges of the state; its origin being in the Ohio Academy of Science. The General Assembly at its 1913 session appropriated the sum of $2,500 for survey purposes which will be used in the collection of data from different regions so as to determine what existing special of plants and animals occur in the state. The survey will serve primarily the educational institutions of the states by preparing duplicate material and representative collections which may be loaned or sold to schools throughout the state. Every year presents new biological problems which have important relation to the economic factors in agricultural development, the utilization of forest areas, the food supply for fish culture in aquatic areas of the state and the importance of such species as may have relation to disease in water contamination or as carriers of diseaess affecting man or dometsic animals.

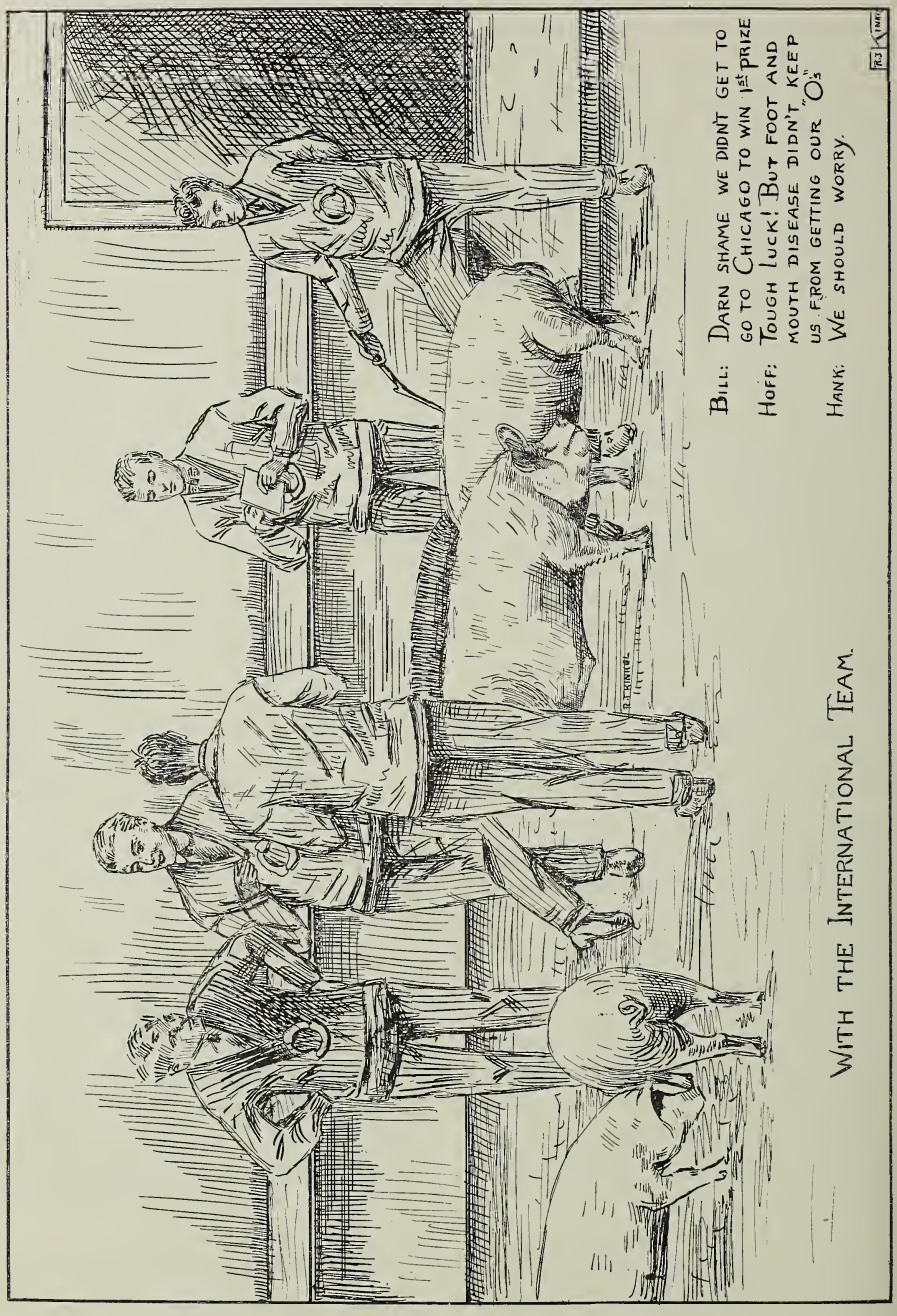
Orders to the effect that Advanced Registry testing shall be discontinued until the foot and mouth disease has been eradicated, have been received at the dairy department from the Guernsey Cattle Club and the Ayrshire Breeders' Association.

J. P. Hershberger, of the agronomy department, conducted the Boys' Corn Judging Contest at Van Wert on Friday, November 27. M. F. Abell, of this department, conducted a similar contest at Lima on the same day.

Participating in three out-of-conference and four Western Conference games, Ohio State finished her 1914 season on Saturday, November 21, by defeating Northwestern University by 27-0, on Ohio Field. All of the out-of-conference games, Wesleyan, Case and Oberlin, were won by State's team; of the conference games, two wer won—from Indiana and Northwestern, and two lost—to Illinois and Wisconsin. Ohio, however, obtained fifth rating, in the rank of Western Conference Universities, which is very good considerin gthe fact that thi sis only the second year of Western Conference activity. Illinois defeated Ohio State on her own field by 37-0 and Wisconsin won by only one point, 7-6, Ohio State failing to kick goal. In the Wisconsin game Ohio State demonstrated her ability to handle the heavy western teams, for Wisconsin met with stubborn difficulties at every point of the game. Indiana was defeated on her own field by 13-2.

Ohio State theoretically won the state championship by defeating Oberlin, her old rival, by 39-0, but, for the reason that teams affiliated with other conferences are not considered, the honor goes to Mount Union.

Ginn, Knoll, Kiefer, Silsby and Canaga, all "ags," have featured in many of the games this season and will be valuable material for next year.



WITH THE INTERNATIONAL TEAM.